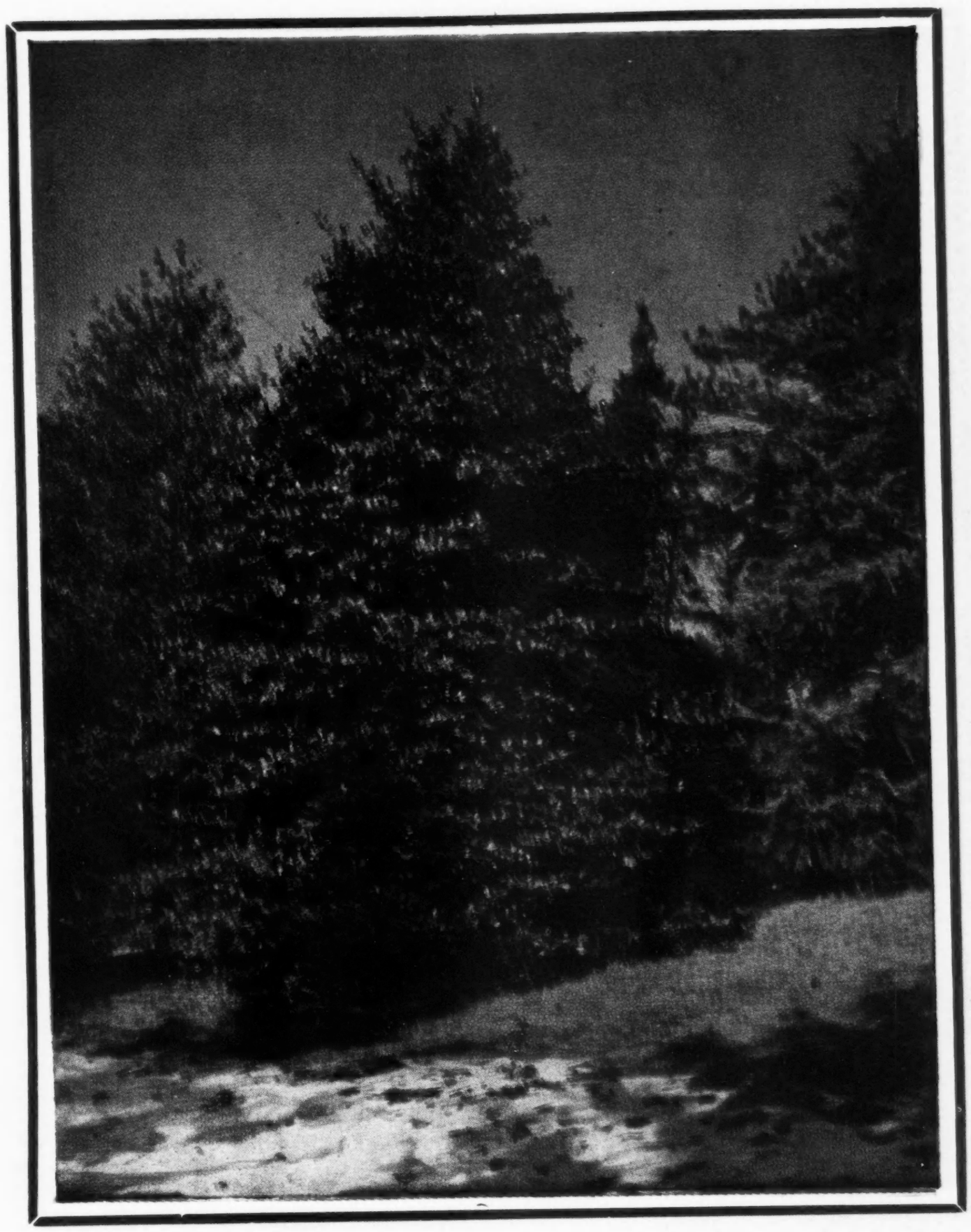
The Garden Journal

of the New York Botanical Garden



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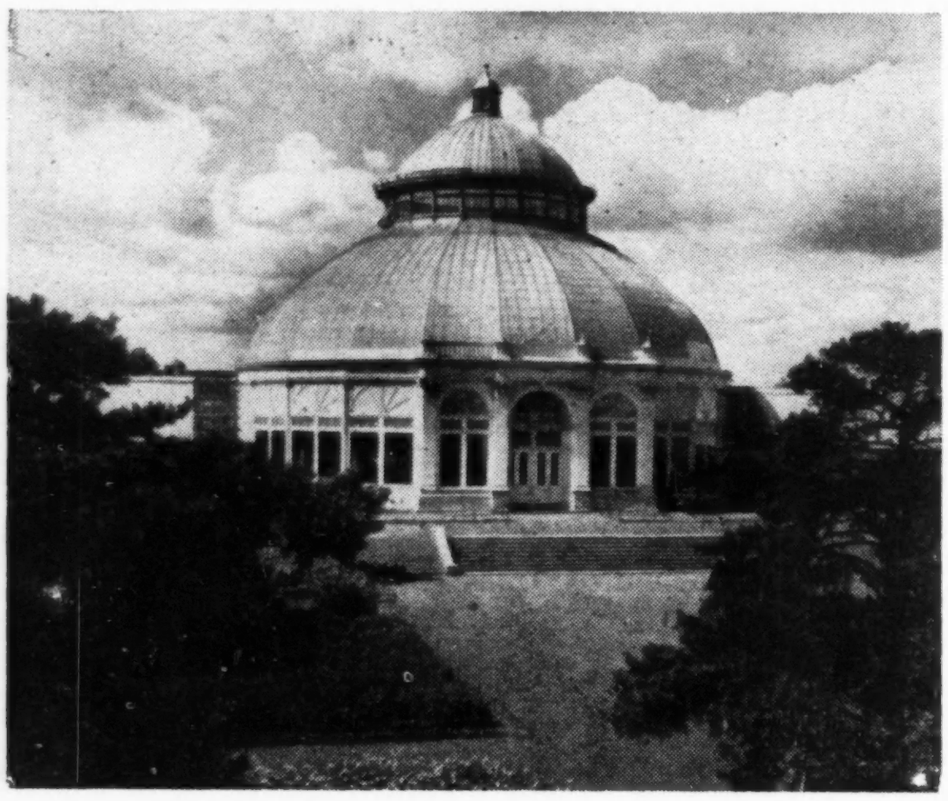

Chrysanthemum Show in the Conservatory of The New York Botanical Garden starts Nov. 2, 1951 and continues for three week-ends.

Puerto Rican Show in the Conservatory of The New York Botanical Garden starts Nov. 30 and continues for three week-ends.

Christmas Show in the Conservatory of The New York Botanical Garden and continues for three week-ends.

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THE GARDEN JOURNAL

of The New York Botanical Garden

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CREDIT FOR ILLUSTRATIONS

Front cover, kodachrome of a Judge Brown holly, named in honor of Judge Thomas Brown of Locust, N. J.; pg. 163, U.S.D.A. Forest Service, Louisiana; pg. 164, U.S.D.A. Forest Service, Georgia; pg. 165, Louisiana Forestry Commission; pg. 166, American Forest Products; pg. 168, Hal H. Harrison, National Audubon Society; pg. 169, Allan D. Cruickshank, National Audubon Society; pg. 170, John K. Terres; pgs. 171, pgs. 174, 175, 176, author; pgs. 177, 178, 179, Gottscho-Schleisner; pgs. 182, 183, 184, American Spice Trade Association; pg. 185, Walter L. Graham; back cover taken in 1896; this is the site of the Thompson Memorial Rock Garden in The New York Botanical Garden.

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SOUTHERN YELLOW PINES

Providers of Wood Products, Naval Stores, Paper Pulp and Chemicals, these trees comprise a million dollar industry

By Edmund H. Fulling

IN a previous article in "The Garden Journal," we traced the development of the American lumber industry from Maine to Wisconsin, as it exploited the once thought inexhaustible white pine resources of northeastern North America, and noted that it attained its peak of production with respect to that tree in 1892. For many years thereafter, the industry continued to operate in the northern woods, for there still were many millions of board feet standing. The concentration of them, however, was not sufficient to meet the ever-increasing demands of the industry, and there again was migration into new fields, this time to the virgin stands on the coastal plain from Virginia to Florida and westward to Texas. It was not white pine, however, that was to inject new life into the industry, for white pine does not grow on the coastal plain, but a medley of six other trees, generally referred to as "southern pines," but known also as "hard pine," "Georgia pine," "pitch pine" and "yellow pine."

To the botanist and forester these six kinds of southern yellow pine, as we shall refer to them by way of distinction from the yellow pines of the western states, are quite distinct and are known as "long-leaf pine" (*Pinus palustris*), "shortleaf pine" (*P. echinata*), "loblolly" (*P. taeda*), "slash pine" (*P. Elliotti*), "pitch pine" (*P. rigida*) and "Jersey pine" (*P. virginiana*). Each of these trees has several other common names, some of them more or less local in usage, but all of them too numerous to be noted here. Each of them, too, has its own range of natural distribution, some greater, some lesser, some of them over-lapping. Pitch pine and Virginia pine are not truly southern pines, for their occurrence in the Carolinas and Georgia represents only the southern extension of ranges beginning much farther north. They have not been important from the lumber industry viewpoint. Of the other four and truly southern yellow pines, longleaf has been the most valuable, slash next.

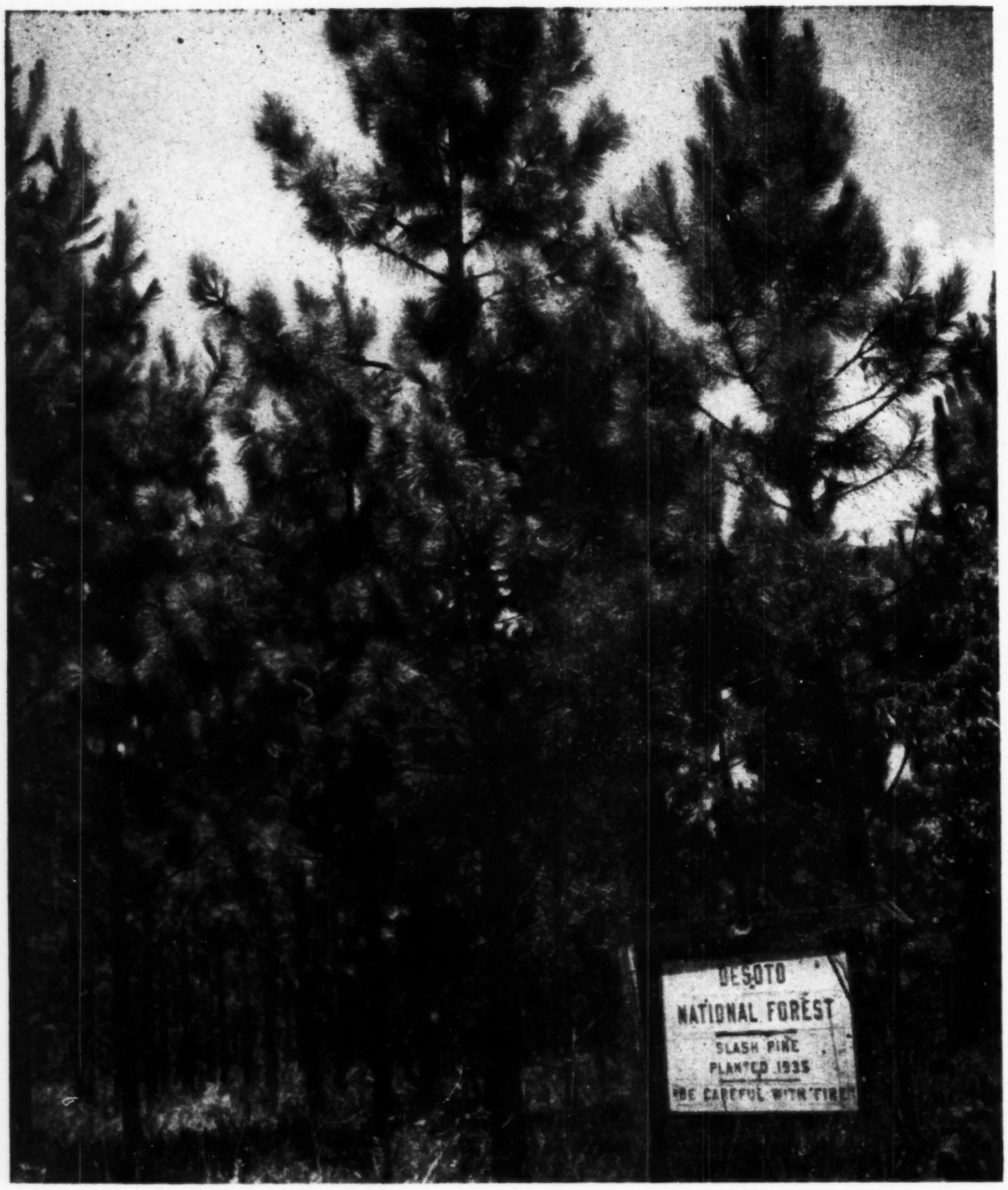
The exploitation of these trees has not been so much a matter of pioneering as was that of white pine; it has been more a chapter in modern industrial development and has involved different types of utilization, such as never entered into the history of white pine. It is fitting, therefore, that the usage of these trees be considered under the following categories, but it would be an unpardonable historical oversight not to mention first that the center of the American lumber industry, in keeping with the westward trend of empire, has long since passed to the Douglas-fir forests of the Pacific Northwest.

Wood Products

For use as poles in power transmission and communication lines, there is an annual drain in the United States of from three to five million trees, and for this purpose southern pines are harvested in greater quantities than any other species. The demands for piling are probably as great, and the same species are used in this category which refers to heavy timbers driven into the ground as support or foundation, or utilized in trestles, over-passes, bridges and similar structures. The annual consumption of about six hundred million fence posts and of about fifty million railroad ties also calls for southern pines in enormous quantities, along with many other species, and they enter, of course, into the two hundred twenty million cubic feet of round timbers and five hundred million board feet of sawed material that annually go into mine timbers. Heavy construction work, shipbuilding, flooring, veneer and many other manufactured products call for other great amounts, and when all the demands are added together, the drain on the southern pineries for wood is still truly huge.

Naval Stores

We noted in the previous article that, except for American white pine, the British navy and other



These slash pines were planted sixteen years ago in De Soto National Forest, Mississippi.

shipping of the seventeenth century were dependent to a large degree upon Scots pines of Scandinavia for masts. Those trees were important to wooden vessels also in another way, for by destructively distilling their wood, that is, burning it in great piles covered with earth so that incomplete combustion was achieved, the shipbuilders obtained the two products, pitch and tar, that were essential for sealing the hulls and decks of those ships. Enormous quantities of these two items were used in the days before ships of steel, and the European shipbuilders referred to them as "naval stores." The possibilities of obtaining these products in the American colonies were as attractive to British shipping interests as was that of getting one-piece pine masts, and in 1608, only one year after the first permanent English colony was established at Jamestown, Virginia, the first exports of tar and pitch were made by the early settlers of coastal Virginia to England.

The industry grew for many years to meet the demands of both European and American shipbuilders, but with the later advent and subsequent great development of steel vessels, the demand for tar and pitch gradually subsided until today it is almost non-existent. Concomitant with that decrease has been an increase in the production and utilization of other products which also come under the heading "naval stores" and which at present constitute one of the foremost industries in the South.

This modern industry is founded in part on the fact that by periodically making incisions into the surface of southern pine tree trunks, according to techniques that have been improved since such operations were first undertaken, great amounts of resinous material are induced to exude, which can then be gathered and subsequently distilled into the distillate known as "turpentine," leaving a residue known as "rosin." Operations of this nature in North America were first undertaken in the year 1605, when the French colonists of Nova Scotia distilled a crude turpentine from the resin of white pine. Such operations have long been pursued in France with *Pinus pinaster*, a hard resinous pine, but the soft American white pine is not sufficiently resinous for the purpose, and the undertaking in Nova Scotia was short-lived. By 1700, however, chipping the hard resinous pines of North Carolina for gum was a well-established industry. In the words of one recent book on the subject, "Tapping operations were conducted in the proximity of navigable streams, where the crude gum was gathered, barreled and shipped to New York, Philadelphia or Wilmington, from which ports it was sent to England for processing. Later, distilling centers were established in the colony, and by the middle of the eighteenth century exports exceeded 60,000 bbl. of pitch, 12,000 bbl. of tar, and 10,000 bbl. of turpentine annually. Peak production in North Carolina was attained in 1880, when there were more than 1,500 turpentine stills in operation within her borders. With the approach of the twentieth century, however, that state's industry was in rapid decline and today is practically a non-entity. The history of the industry in South Carolina followed a similar pattern. Only in 1880 did her production ever exceed that of her sister state to the north, and today less than two per cent of the annual output of the South is of South Carolina origin."

By 1890, Georgia became a world leader in naval-stores production and today supplies nearly three-quarters of the domestic output and more than one-third of the world's requirements. Along with smaller amounts from Alabama, Florida, Louisiana, Mississippi and eastern Texas, nearly one-half of the world's naval stores requirements comes from these states, but the peak of American pro-

duction was achieved more than forty years ago, in 1909, when seven hundred fifty thousand barrels of turpentine and more than two million, five hundred thousand barrels of rosin were produced. Unlike the lumber industry, however, this one has not shifted to the West, for it is only in the South, so far as the United States is concerned, that naval stores can be produced.

Up to twenty or thirty years ago, naval stores were obtained for the most part, if not almost exclusively, by distillation of the resin from living longleaf and slash pines. Obtained in this manner, the products are now referred to as "gum naval stores." Today, as the result of improved techniques designed to achieve closer utilization of forest products, more than fifty per cent of all naval stores are derived in three other ways, and are referred to as "wood naval stores." These methods, too, involve distillation, and the four methods in use at present can be described as follows:

a) Distillation, as in the past, of the resin obtained by tapping living trees, the distillate yielding turpentine, the residue rosin.

b) Destructive Distillation. This method consists of loading logs, approximately of four-foot length, into retorts of various sizes, sealing the retorts and then heating them in various ways and for varying periods of time up to sixteen hours or so, followed by a cooling period of several hours. Since air is not admitted into the retorts during the heating, there is not any combustion of the wood but, instead, destructive distillation of it, that is, a separation and molecular break-down of its components. Heavy pitch, or tar, accumulates on the bottom of the retorts, to be drawn off after distillation is completed, and vapors are led to condensers. The condensed vapors go to separating tanks, where water and oil separate by gravity, and the crude oily distillate is subsequently refined into various products. The principal products obtained by the entire process are charcoal, dipentene, pine oil, pine tar, pinene, pitch, tar oils, turpene alcohols, turpentine and wood acids.

Destructive distillation of softwoods is at present carried out only with southern pines, and in 1950 there were nine plants operating in the South. They consume about one hundred twenty thousand cords of wood annually, not of freshly cut trees, which are not sufficiently resinous, but of the more resinous fallen trees, logs and stumps, so old that the sapwood has rotted away, and of the resinous bases of limbs, known as "pine knots," and of slabs from logs cut from trees that have been tapped for naval stores.

c) Steam Distillation and Solvent Processing. In this method the wood is ground into small pieces and then steamed to extract its turpentine and some of its oil. Rosin is extracted from the residue by a suitable solvent, such as gasoline or hot petroleum naphtha, and is recovered from the resulting solution by evaporation of the solvent. The steaming operation may be eliminated, and all the components — turpentine, pine oils and rosin — extracted simultaneously with a suitable solvent, to be subsequently separated by fractional distillation, leaving a residue of crude wood rosin.

Today there are fourteen modern steam and solvent extraction plants in the South, producing about fifty per cent of all rosin and nearly thirty per cent of all turpentine produced in the United States. They annually consume great quantities of wood;

These virgin longleaf pines in Berrien County, Georgia, are 150 years old.

one authority states between three hundred and three hundred fifty thousand tons, another about two million tons. The latter figure may include stumpage used in destructive distillation, but such distinction is not made in the statement. Seventy-five per cent of this wood is stumpwood of longleaf and slash pine, the gathering of which is an enterprise in itself, for it necessitates powerful machinery and blasting. The remaining twenty-five per cent consists mostly of the heartwood of trees left standing after logging operations. It has been estimated that in South Carolina, Georgia and Florida alone there are available about twenty million tons of merchantable stumps with a potential reserve of another nine million. Some of the stumpwood is thirty to forty years old.

d) Distillation from Sulfate Pulp. The gases arising during the cooking of sulfate pulp of all the southern pines contain recoverable quantities of turpentine, the greatest amounts, from three to four gallons per ton of air-dry pulp, coming from longleaf and slash pines. These gases are condensed by passing them through coils in cold water, yielding not only the turpentine but also some pine oil, which, however, is inferior to that obtained by the steam and solvent process. Formerly these condensates were only waste liquors, and the recovery of turpentine and pine oil from them represents another achievement in the closer utilization of forest products, so much so that this by-product production may render it not economically worthwhile to expand the present utilization of stumpwood and of sawmill waste for the same purpose.

To list in detail all the modern uses of naval stores—rosin, turpentine, oils, tar and pitch—would be a formidable undertaking, and only the following resume can be given here. Turpentine consumption in the United States amounts to about five hundred thousand barrels annually, the bulk of which is used in the manufacture of paints, varnishes, lacquers, synthetic camphor, pharmaceuticals and chemicals, as a solvent for rubber and waterproofing compounds, and as an insecticide. In addition, there are many minor uses.

Rosin, known also as "colophony," is used annually by American industry to the extent of more than one million drums, principally in the manufacture of soaps, paints, varnishes, lacquer, paper, adhesives, plastics, rubber, synthetic resins, chemicals and pharmaceuticals. Pine oil, about five million gallons of which constitute the annual production, finds use principally as a frothing agent in the separation of metals by flotation. Large quantities are consumed also in laundries and in dyeing textiles as well as in the manufacture of soaps, polishing compounds, paint, varnish removers, germicides, insecticides and pharmaceutical preparations. Pine tar is used as a disinfectant and antiseptic, and for lubrication of cordage.

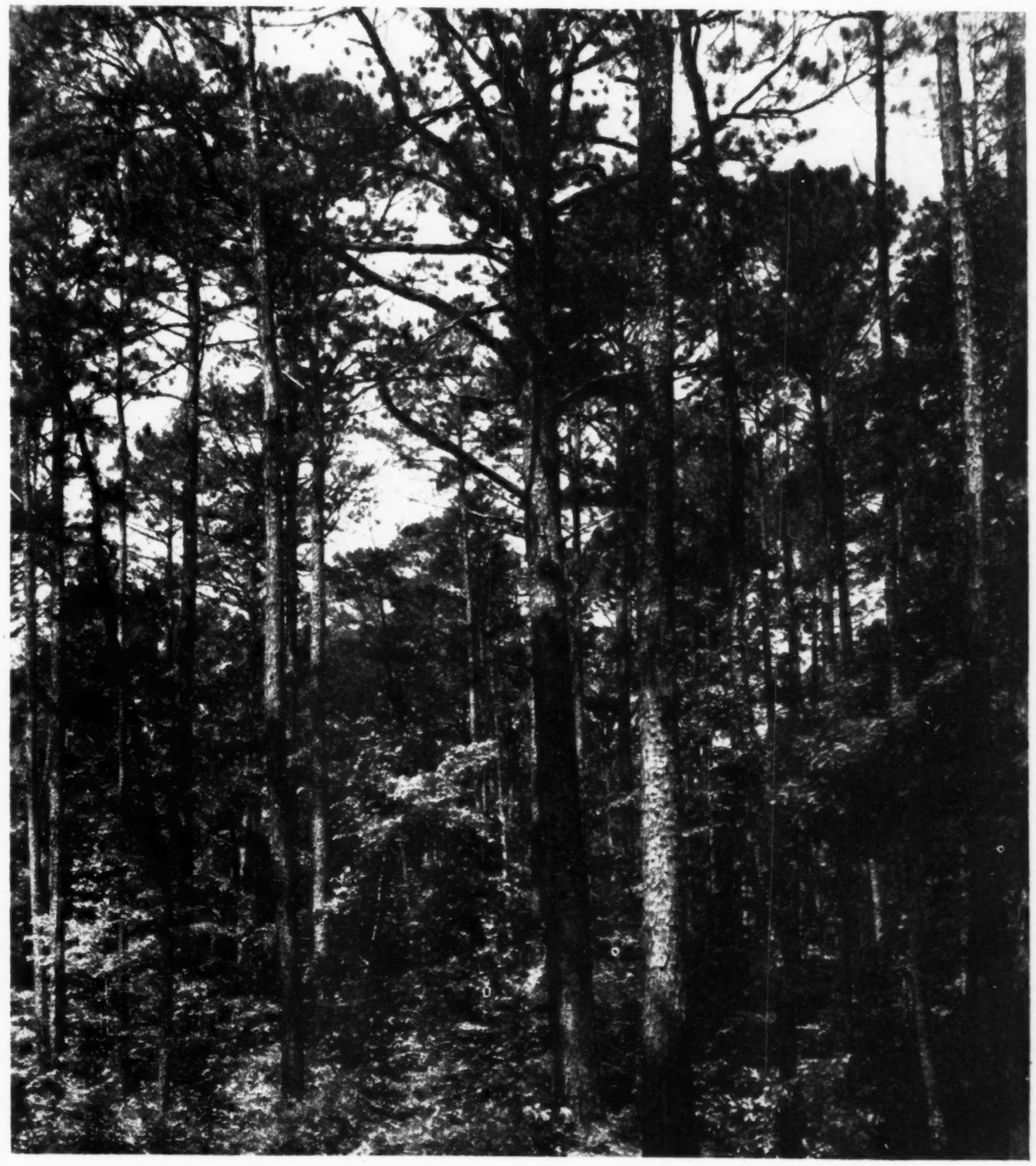
Paper Pulp

For a great many years, until about two decades ago, spruce was regarded as the wood par excellence for conversion into paper pulp. Its greatest relative use in this respect was in 1899, when it made up seventy-six per cent of all domestically produced pulp, and its absolute peak was attained in 1920 with a consumption of nearly three and one-half million cords. This preference for spruce was based on its relatively strong and long (3 mm.) fibers, on its comparative freedom from resins, gums and other undesirable materials, on its relative abundant supply and on low stumpage values. Resinous woods during that period of spruce supremacy were looked upon as unfit for manufacture into pulp, and for that reason the southern yellow pines, valuable for naval stores because of their resin content, were shunned for the very same reason when it came to producing paper pulp. Some use, however, was made of them, to the extent of sixty-nine thousand cords in 1906, but it was not until the 1920's that the southern pines began to attain importance in the paper pulp industry.

One of the greatest stories in modern industrial chemistry is associated with this development, one of those great advances that come from the brilliance, perseverance and foresight of one man and of those associated with or influenced by him. When Dr. Charles Holmes Herty, at one time president of the American Chemical Society and accepted as the world's foremost authority on the chemistry of cellulose, was nearly sixty years of age, he launched what was to become a ten-year effort to bring newsprint manufacture to the South. The status of that and allied industries today, where cotton was once the only important crop, is a monument to his pioneering work. It is far beyond the limits of this article to discuss the conversion of southern yellow pines, or of any other trees for that matter, into paper pulp. More important for our purpose is to acquire a genuine appreciation of the revolution brought about, and this can best be done by consideration of a few statistics.

The first mill producing newsprint from southern pine was at Lufkin, Texas, the place of the mill at the edge of the town having since been named Herty, and the first use of such newsprint on a commercial scale was in the June 20, 1921, issue of the "Birmingham Age-Herald." Today there are forty mills in the South producing paper pulp from southern pine exclusively, only two of them, however, being engaged in manufacturing newsprint. The largest pulp mill in the world, at Georgetown, South Carolina, uses about twenty-five hundred cords of wood daily, mostly pine with some hardwood, and one year consumed eight hundred seventy-five thousand cords. All these mills together produce at present about forty-five per cent of our domestic pulp, spruce and fir contributing about twenty-two per cent. Southern pine is thus the leading pulp wood today. This tremendous increase has come about in

This well-managed stand of short-leaf pine averages fifteen thousand board feet an acre.



An even-age stand of eighty-three-year-old loblolly pine that was naturally reproduced on an already once-cut forest area.

thirty years. In 1919 the percentage was less than five, but by 1939 it had exceeded the role of spruce. From the sixty-nine thousand cords used in 1906, the quantity increased to over ten million in 1948, and along with this phenomenal increase has been an investment during the past fifteen years of about one and a quarter billion dollars in timber holdings, plant construction and equipment for paper manufacture in the South.

This pulp industry of the South is based largely on second growth trees, but worked-out naval stores timber is also utilized. While manufacture of white southern-pine newsprint is now on a commercial scale, most of the product is unbleached, or kraft, paper, produced by what is known as the sulfate process and used for wrapping and similar purposes calling for strength. This darker colored pulp can, however, be bleached, and great amounts of bleached pulp are now going into book, writing and other papers. The black liquor obtained by the sulphate process contains appreciable amounts of resins and fats that can be skimmed off and converted into tall oil. In the 1945-46 naval stores year over two hundred thousand tons of this liquor were processed into nearly ninety-five thousand tons of the oil which is utilized in the manufacture of soaps or for conversion into solid fatty acids suitable as substitutes for the more expensive vegetable and animal fats. Finally, it must be mentioned, the same crude soap furnishing tall oil also yields pitch which finds use in the manufacture of varnishes and printer's ink, and as a substitute for asphalt in road construction.

Minor or Undeveloped Uses

Pine needles are extensively used in the South as "pine straw" for mulching strawberry beds, and a patent has been issued for converting longleaf pine needles into litter for poultry houses. They have been utilized also in household weaving of baskets, and attempts have been made to convert them into mattress stuffing. Every two hundred fifty pounds of fresh longleaf needles and twigs is capable of yielding about one pound of oil by steam distillation, and for seventy or more years there has been minor production of such pine-needle oil. It has numerous uses, as in the perfuming of soaps, greases and other preparations and for medical purposes in treating pulmonary and bronchial diseases and as a liniment for external application. It is difficult to imagine that the trees themselves have escaped that use which seems to befall every type of evergreen tree, somewhere and at some time, regardless of how unsuitable it may be, that of serving as Christmas trees.

Among the minor uses of southern pine wood, always along with that of other species, are the manufacture of excelsior for packing purposes and of fiberboard as thermal-insulating material. And in southern New Jersey, shortleaf and Virginia pine are converted by incomplete combustion of the wood into specialized types of charcoal for filtering and other industrial purposes.

One of the potentially important but as yet solely experimental types of southern pine utilization is that of wood saccharification, a process by means of which the cellulose content of wood is converted through acid hydrolysis into simple sugars useful in the propagation of yeasts to be used as stock feed, as high-protein food for human consumption, or as a base for fermentation into industrial ethyl alcohol. The possibilities inherent in this process became important with the greatly increased demand for industrial alcohol in World War II, and investigations were conducted at the U. S. Forest Products Laboratory, Madison, Wisconsin, particularly on Douglas-fir of the Pacific Coast and on southern yellow pine.

American Holly -

Comes in to its Own

By Charles H. Connors

SCATTERED throughout the coastal plain from Maine to Florida, along the Gulf States to Texas and up the Mississippi River and its branches to Indiana, the searcher will find trees of American holly that have been preserved on property for one to two hundred or more years. They have been prized and protected because of the brilliant display of fruits in the winter. Many of them stand in original positions; some were transplanted.

In the upsurge of landscape development in the nineteenth century, every property of size had a few hollies. Then the ordinary folks transplanted them, especially near the shore.

Now we are in a resurgence of holly planting, because the beauty of the plant in the landscape is becoming more and more appreciated. This renaissance is more widespread, and is not solely the result of popular favor. It is more stable, because behind it are the enthusiasms of certain individuals and a growth of knowledge pertaining to the plant.

As I consider this, a few persons and events come to mind. A certain lady, living and working in natural surroundings, a lover of nature, realized the great difference between holly trees and began to select and propagate vegetatively, so she had uniform progeny. A potato and fruit grower, admirer of holly from his early youth, gradually changed his operations, when opportunity came, from prosaic farm products to the favored plant of his youth and now grows and promotes only holly. A business man, taking his living from the land on which holly grows, naturally conceived the idea of sending to each of his customers at Christmas a box of foliage and berries, and now these go in great number to people all over the eastern part of the country. Upon expression of interest, he distributed plants. A public official, retiring to the nursery and landscape business in a region of holly, began to seek out for transplanting and for propagating some of the better forms. A clergyman in the South spends his spare time going about seeking good hollies, and his avocation will eventually become a vocation. A nurseryman in the Middle West specializes in only four items, one of which is American holly, and he spends his spare time in more southerly regions, seeking out good things. A garden club, aware of the destruction brought about by unrestrained harvesting at Christmas time, fostered a movement for restricted cutting by approved methods and placed its stamp of approval on all material so cut. A circuit court judge, living on a place which he calls Holly Hill, sitting in the trial of a case of illuminating gas injury to greenhouse plants, was impressed by the testimony of two expert witnesses, brought up the subject of holly, invited the witnesses to his place, imbued them with some of his enthusiasm and, as a result, a holly research committee was formed at the New Jersey Agricultural Experiment Station of Rutgers University, and now the holly is the subject of deep study in all phases of its culture.

These are but a few of the persons and events that are influencing the renaissance of holly planting. As a result, it will not be a mere fad, as so often happens, but will bring about a restoration to the landscape of a plant rapidly nearing extinction. It will create a permanent beauty, for these plants will live for centuries.

And the utility of the plant extends beyond the creation of beauty and sense of pride in the individual who possesses a fine specimen. The plant has possibilities in reforestation and soil conservation where conditions are suitable, and this again will result in commercial orchards, properly managed, so they will yield a financial return to the owners and will bring pleasure to thousands to whom the material will become available.

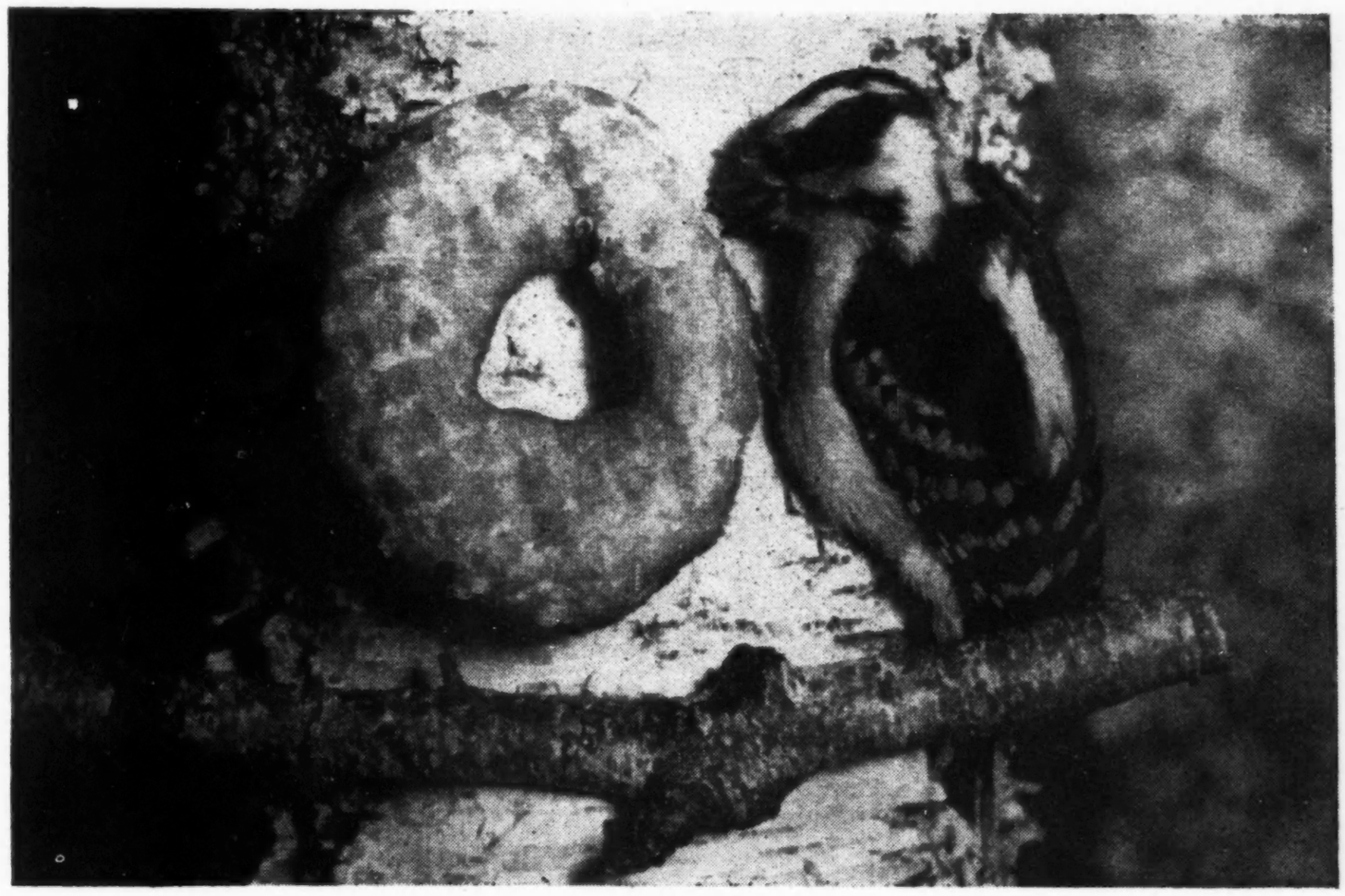
Among the things learned about holly that has contributed to the rapid spread of the plant is that it can be transplanted with no more pains than those taken with all evergreens. The old theory was that the leaves must be stripped from the trees at time of transplanting, but this actually was a sequence to careless handling of the roots.

All holly plants are not alike. There is a considerable variation in habit of growth. Some grow naturally rather compact, some have drooping branches, others are so erratic that no amount of care and pruning will produce a good plant. Now and then appears a plant that is well adapted to forming a hedge, and a hedge of one variety is much more uniform and presentable than one composed of miscellaneous seedlings. There is a great range in form of leaves, from as narrow as one-half inch to as broad as two inches or more and from a length of one and a half inches to five inches. In color, the foliage may be a dark green all year round or it may turn yellowish in winter. Some lose their leaves early. The blooming habit varies. Of course, there are female trees to bear fruits and male trees to produce pollen. We have seen a male tree that does not bloom until all the female trees are past bloom. The fruits may vary in size from one-eighth inch to

(*Continued on page* 187)

MAKING FRIENDS WITH BIRDS IN THE WINTER

By John K. Terres



A doughnut attracts a downy woodpecker.

ABOUT thirty years ago, when I was a boy in a small southern New Jersey village, a man came to live there who soon gained a wide reputation as a competent naturalist. I had learned a lot about wild birds, but Ernest Musselman taught me a great deal more. I had no field glasses, or binoculars, in those days and though I was a sharp-eyed stalker of birds, I could never get as close to them as I wished.

"Get the birds to come to you," Mr. Musselman told me. "Make friends with them by offering them food and water."

That advice started me on a bird-attracting campaign in my backyard that has continued ever since, wherever I have lived—on a farm, in a village, and even within the limits of a large city.

Bird-Feeding Stations

In the northeastern states, of all times of the year, fall is the most rewarding in which to start feeding birds. If birds have not been accustomed to feeding in your yard or garden, feeding stations where seeds of your bird food mixture will be available to the birds every day, should be set up at some distance from the house. As the birds become used to coming to your feeders, these may gradually be moved closer to the house until the birds are feeding just outside your window. The trolley-feeder, a small bird feeder that can be suspended from a wire or a clothes rope and drawn a few feet nearer the window each day, is an excellent device for getting birds to come to your window-shelf feeder, where they soon learn that your movements beyond the window glass mean no harm to them.

Where to Place The Bird-Feeding Stations

Feeding stations, when finally established permanently on your lawn or in your garden, should be near shrubbery, behind trees or buildings, or on sloping ground, away from the direction of prevailing winter winds, so as to give the feeding birds protection. Trees and shrubs near feeders, particularly evergreens, provide thick cover where song birds may quickly escape from shrikes and small hawks that are sometimes attracted to a concentration of small birds, which, to them, is a food supply.

Feeders should also be located where they may be seen from the house, perhaps opposite the kitchen, dining room, and living room windows. Their height above the ground should be no higher than you can reach to refill them. Wintering cardinals and catbirds, tufted titmice, chickadees, nuthatches, blue jays and other birds will come to these above-the-ground feeders, also tree sparrows, song sparrows, and juncos although most of the sparrow tribe prefer to feed on the ground. The bird-feeding program should include wire cages to hold suet, or meat fat, so dear to the appetites of woodpeckers. These should be nailed to the trunks of trees. Feeding sticks, hung from the tree branches and filled with peanut butter, will bring chickadees, brown creepers and other birds.

The Birds You May Attract

Unless you live in the heart of a large city, your feeders will be patronized by many species of birds besides house, or "English" sparrows and starlings. In our northeastern states, we may expect birds from three groups: some of the permanent residents—chickadees, tufted titmice, blue jays, white-breasted nuthatches, and downy woodpeckers—which live in one locality the year round; winter visitors—tree sparrows, white-throated sparrows and juncos—birds that move southward from regions farther north; and the occasional summer residents — perhaps catbirds, song sparrows, towhees and grackles —that ordinarily migrate south from our northern states, but may linger at our feeders throughout the winter, because we provide a reliable and daily source of food for them. In feeding birds we must remember that it is the availability of food, not low temperatures, that determines whether or not most birds can survive our northern winters.

Some of the birds from the far north that spread over the eastern states during certain winters—redpolls, pine grosbeaks, evening gros-

The white-breasted nuthatch enjoys suet—he likes peanut butter, too.

beaks, pine siskins, crossbills and snow buntings—may add to your excitement over the new bird guests that come to your feeders in the yard and garden. Many other species of birds, besides, may spend the winter at your feeding trays and by their flashing wings and voices bring a new interest to what might be, otherwise, dull winter days. For either a parent or child, I know of no better way to learn the identities and interesting habits of wild birds.

What to Feed the Birds

Although bread is not harmful to birds, it is not a food which will sustain them for long. There are many good bird food mixtures sold from which you can make a choice, or you may wish to prepare a mixture of your own. Basic seeds in any mixture, to attract the greatest numbers of birds should contain about twenty-five percent of sunflower seeds; twenty-five percent of hemp; twenty percent of small yellow millet; and ten percent of buckwheat to which may be added finely cracked corn, clean sand, or gravel, for grit.

Sunflower seeds are a "must" to attract evening grosbeaks, purple-finches, goldfinches, cardinals, crossbills, and other birds, but I have seen goldfinches and evening grosbeaks leave sunflower seeds to eat peanut hearts, the most popular of all foods with birds. Peanut butter, spread in the holes of the feeding sticks and on the bark of trees, is a favorite food of chickadees and brown creepers and they often prefer it to suet. White-breasted nuthatches, tree sparrows, juncos and other birds are also fond of peanut butter. Cracked corn, although cheaper than commercial seed mixtures, is not much favored by song birds.

Raisins and dried berries are excellent for catbirds, robins and wintering thrushes, which ordinarily eat the fruits of many trees and shrubs. Robins are also fond of cooked spaghetti; finely ground dog biscuit is a good substitute for more expensive nut meats, which most birds like, particularly in cold weather. Chaff, or barn floor sweepings, has grass and weed seeds and, if spread on the ground at the edge of open areas, will attract the field-dwelling horned larks and snow buntings, besides tree sparrows and juncos.

Problem Guests At the Feeding Stations

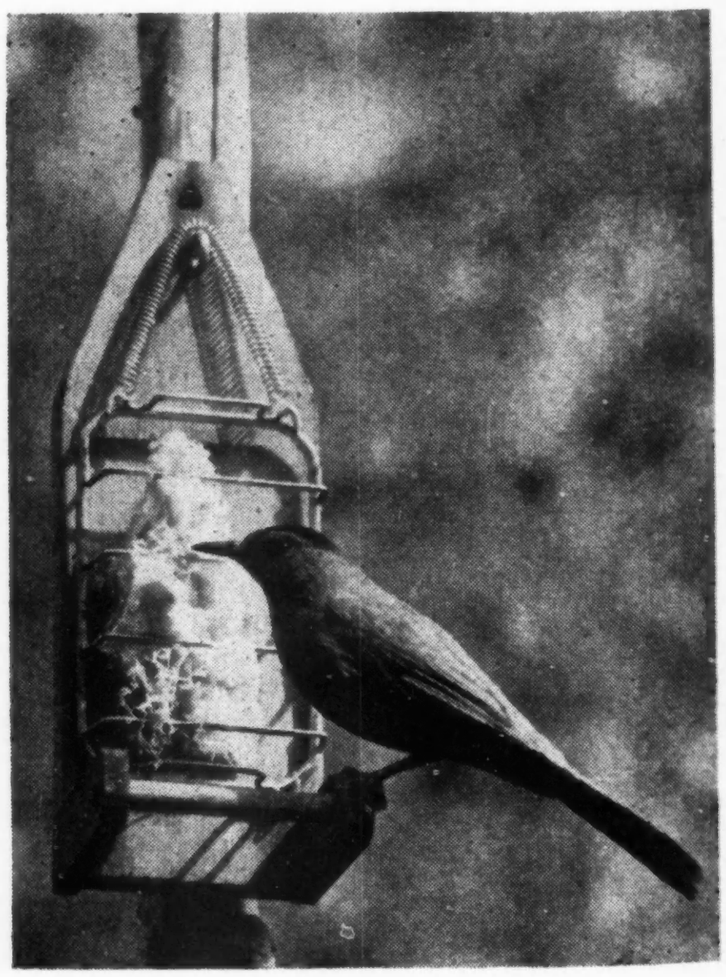
With the coming of snow and cold weather, English sparrows and starlings often concentrate at bird feeders, and gray and red squirrels may come for their share of your hospitality. Some people like to feed these guests, too, but others consider them unwanted pests which may frighten or chase away the more timid, native song birds. Both English sparrows and starlings are useful because of their insectivorous habits in summer and can be lured to other feeding places by scattering bread and grain on the ground in a far corner of the yard. Squirrel-proof feeders, sold by various dealers in bird-feeding stations, may be put up in the yard, or a circular piece of thin sheet metal, shaped like a lamp shade, may be nailed about half-way up the post supporting your feeding station. This will prevent squirrels and cats from disturbing birds while they are on the feeders.

There are a few basic rules in feeding birds in winter, that, if followed, will insure your success in attracting and keeping birds in your yard and garden. They are:

1. Make your feeding preparations before cold weather arrives, preferably from September to November in the northeastern states.
2. Supply birds with food and water every day.
3. Supply grit in the bird seed mixtures.
4. Be careful that the feeders are never empty, particularly during snow and ice storms, and periods of extremely cold weather.
5. Once you have started, *continue your feeding without fail throughout the winter and well into spring.*

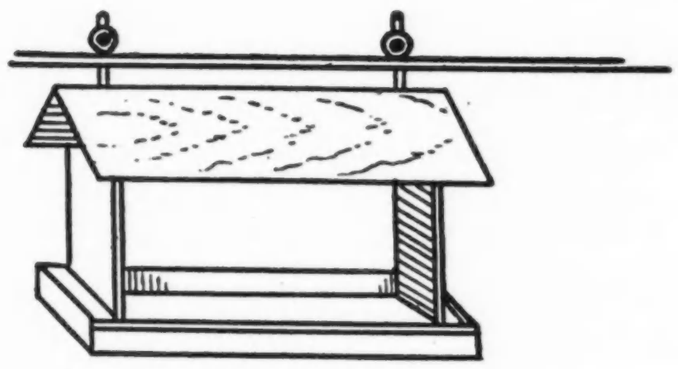
A few years ago, a controversy raged among amateur and professional ornithologists whether one should feed wild birds in winter. Like other questions of this kind, it arose over the possible harmful effects that winter feeding might have upon bird life. Some argued that, in our northern states, it would encourage white-throated sparrows, catbirds, brown thrashers and other birds, which ordinarily spend the winter south of the New York City region, to remain in the northern states with the possible risk that they might perish, particularly if the people who fed them suddenly lost interest and stopped feeding the birds in the middle of winter.

This is tragically true and imposes upon us the humane responsibility that, if we start to feed birds in the fall, we must continue to do so daily throughout the winter. To fail might mean the sacrifice of the lives of many songbirds that have learned to depend upon us for food.

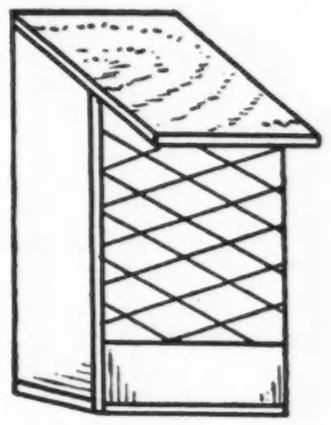


A catbird rests upon a suet rack.

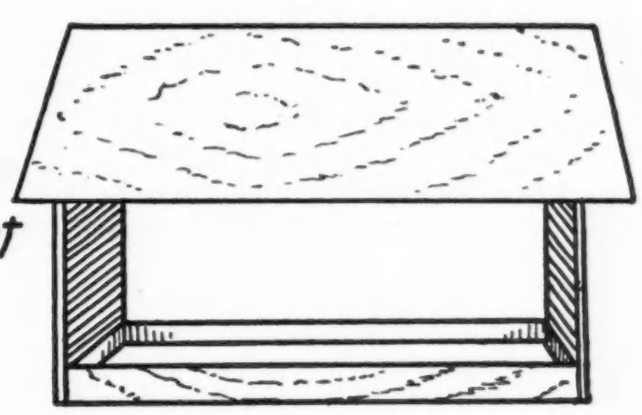
Types of Bird Feeders



Trolley feeders

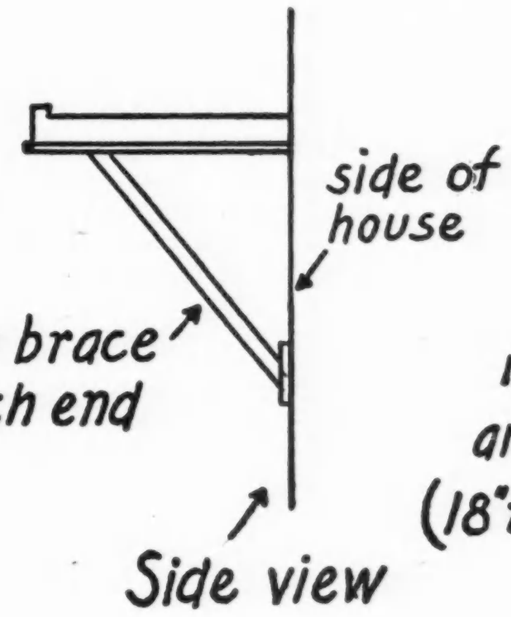


Suet box—nail to tree



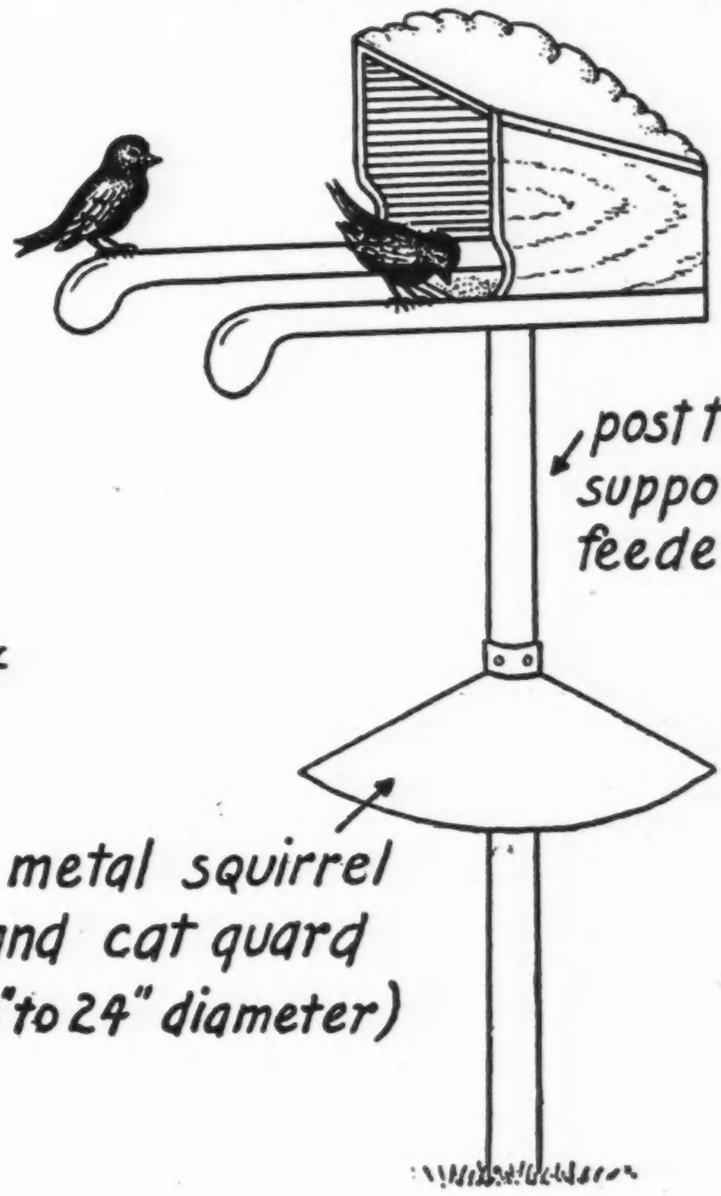
Tree box feeder
(nail to tree)

Window shelf feeder



Side view

Weather vane feeder



EUGLENA AND VITAMIN B_{12}

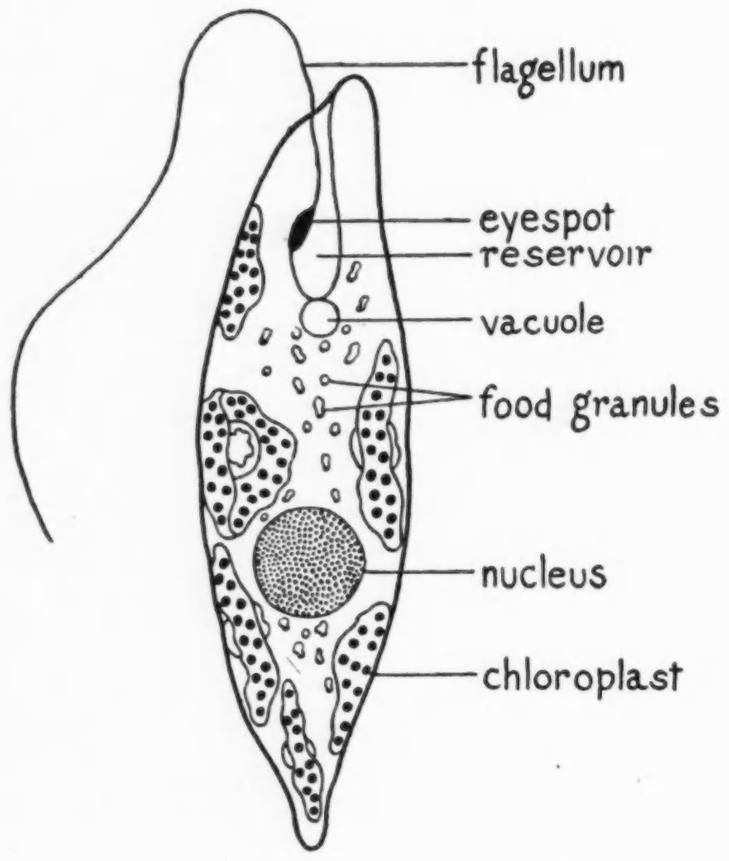
By William J. Robbins

For the past two years, Dr. William J. Robbins, with the assistance of Dr. Annette Hervey and Miss Mary E. Stebbins, has been occupied with an investigation of the anti-pernicious anemia factor (vitamin B_{12}). This work was supported in part by the Lucy Benjamin Rogers Fund and the Howard Bayne Research Fund of The New York Botanical Garden. The article which follows presents some of the background and results of the research.

EUGLENA is a unicellular microscopic green alga. Though generally considered to be a plant, it has been at various times classified in the animal kingdom and placed with the protozoa. It grows in hog wallows, ponds and other quiet bodies of more or less fresh water. In such locations innumerable numbers of this plant produce, in late summer, a greenish coating over the surface of the water. This is often called water bloom.

A single *Euglena* is more or less spindle shaped. There is a depression at one end from the base of which a whip-like organ extends. This organ, the flagellum, lashing back and forth, enables the organism to swim. Near the base of the flagellum there is a spot of red pigment. This is the stigma or eye spot and is supposed to enable the organism to detect light toward which it will swim. *Euglena* contains green organs, the chloroplasts, by which the creature makes its own food from carbon dixoide and water. It reproduces by dividing lengthwise, a single organism in this way forming two. No sexual or gametic reproduction has been reported. All species of *Euglena* are microscopic in size, the surface of a pin head would accommodate from 2,000 to 3,000 individuals.

Leeuwenhoek saw *Euglena* under his microscope and described the organism in a letter written in 1674 to Henry Odenberg, Secretary of the Royal Society of London. A brief quotation from his letter[1] will give the flavor of this extraordinary Hollander who first made and used a microscope.



A single *Euglena* enlarged to show its various organs.

"About two hours distant from this Town there lies an inland lake, called the Berkelse Mere, whose bottom in many places is very marshy, or boggy. Its water is in winter very clear, but at the beginning or in the middle of summer it becomes whitish, and there are then little green clouds floating through it; . . . Passing just lately over this lake, at a time when the wind blew pretty hard, and seeing the water as above described, I took up a little of it in a glass phial; and examining this water next day, I found floating therein divers earthy particles, and some green streaks, spirally wound serpent-wise, and orderly arranged, after the manner of the copper or tin worms, which distillers use to cool their liquors as they distill over. The whole circumference of each of these streaks was about the thickness of a hair of one's head.[2] . . . and there were very small green globules as well. Among these there were, besides, very many little animalcules, whereof some were roundish, while others, a bit bigger, consisted of an oval. On these last I saw two little legs near the head, and two little fins at the hindmost end of the body.[3] Others were somewhat longer than an oval, and these were very slow a-moving, and few in number. These animalcules had divers colours, some being whitish and transparent; others were green with very glittering little scales; others again were green in the middle, and before and behind white;[4] others yet were ashen grey. And the motion of most of these animalcules in the water was so swift, and so various, upwards, downwards, and round about, that 'twas wonderful to see: and I judge that some of these little creatures were above a thousand times smaller than the smallest ones I have ever yet seen, upon the rind of cheese, in wheaten flour, mould, and the like.[5]"

Other users of the microscope observed this minute creature and gave it various names. In 1830, nearly one hundred sixty years after it was first observed, the German botanist Ehrenberg christened it *Euglena* and described two species. To one, *Euglena sanguinea,* he gave the common name, Blutfarbiges Augentierchen, the blood-colored little animal with an eye. This species contains a red pigment in addition to chlorophyll and when it grows in mass gives water a reddish hue. The second species, which is green, Ehrenberg named *Euglena viridis.*

Ehrenberg's curiosity about these microscopic plants did not end in 1830. In 1838 he described and illustrated in color, in a folio volume which we have in the library of The New York Botanical Garden, eleven species. In 1883 Klebs recognized thirteen species and eleven varieties, among which was *Euglena gracilis,* about which I shall have more to say later.

At present about fifty species of *Euglena* are known, most of which can be found within the limits of the United States. The various species are distinguished by differences in size, shape and microscopic structure. They vary somewhat in the

optimum temperature for growth and in other characteristics.

I cannot repeat here all that has been learned about *Euglena* in the two hundred seventy-five years since Leeuwenhoek first saw it. A good many men spent a good deal of time and effort accumulating information about this small group of minute plants. They were not interested because it had any use or was of any known practical importance; they had inquiring minds and wanted to learn as much as they could about the world in which we live.

One of the questions with which some of these men were concerned was the nutrition of *Euglena.* Most plants which contain chlorophyll, as *Euglena* does, will grow and flourish if furnished with suitable mineral salts and exposed to sunlight and air. *Euglena* under these conditions will not grow; it was found to need, in addition, some kind of natural organic material, such as peptone. This made it unique among green plants and raised a question: What did peptone supply which *Euglena* needed for its growth?

About fifteen years ago, a young graduate student at Cornell University, Seymour Hutner, [6] looked for the answer to this question. After some two years of work, he concluded that *Euglena* needed for its growth and well-being an unidentified thermostable, water-soluble substance present in urine and numerous other natural materials. He was unable to isolate or to identify the substance concerned. In fact, it was more than ten years later that Hutner discovered the essential substance needed by *Euglena,* to be the newly isolated anti-pernicious anemia vitamin, vitamin B_{12}.

Vitamin B_{12} has a most interesting history. It is a red crystalline material with a molecular weight of 1,400 or 1,500. It contains one atom of cobalt in each molecule. It was isolated from liver in 1948 by a group of investigators at Merck & Company and simultaneously by scientists at the Glaxo Laboratories in Great Britain. The isolation of vitamin B_{12} terminated a long search, which began with the use of liver feeding by Minot for relieving the symptoms of pernicious anemia. In his Nobel lecture in 1934, Minot said:

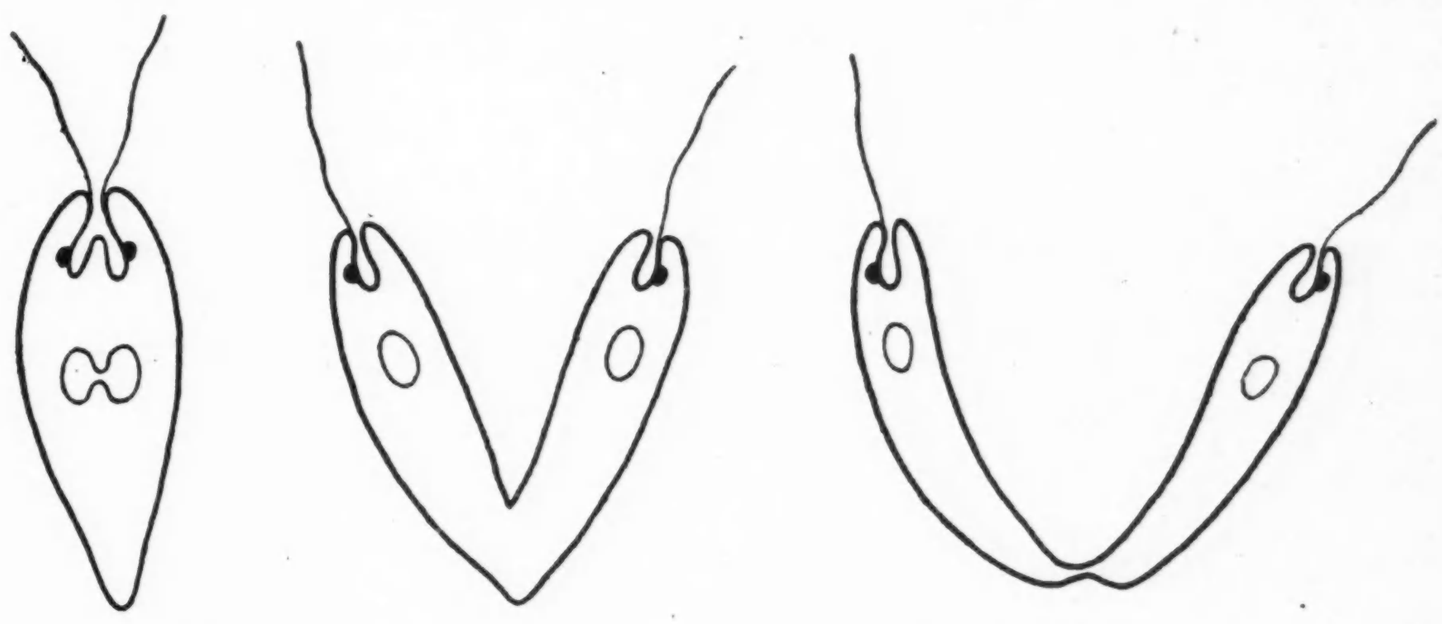
"Liver feeding is dramatically effective for pernicious anemia patients. It seems to me that we may expect in the future more information to be obtained which directly or indirectly will follow as the result of these observations."

Minot's prediction was realized by the isolation from liver, fourteen years after his lecture, of the principle active in alleviating pernicious anemia. One millionth of a gram of pure B_{12} given parenterally daily, is sufficient to maintain a pernicious anemia patient in remission.

At this point we might stop a moment and summarize briefly what was known about vitamin B_{12} by 1948.

It was known that some animals and man required something in their food in order to make red blood and to grow normally. This was present in liver, fish meal and other meat products; it was not furnished by grass and the common vegetables, fruits or grains. For satisfactory growth and normal well-being, it was necessary to include in the diet of some animals, pigs and chickens, for example, some kind of animal protein. The essential something was isolated from liver and found to be an extremely potent organic chemical compound, vitamin B_{12}. It could replace the animal protein factor in the diet of chickens. Some animals, however, did not seem to require this factor; cows, sheep, horses and other herbivorous animals could live satisfactorily on a diet which was limited to plants. Some unfortunate people, those who suffer from pernicious anemia, could not readily obtain B_{12} from the usual diet. Their condition could be relieved by giving them the pure chemical, vitamin B_{12}. Finally, it was found that some bacteria and the simple green plant, *Euglena,* also required this factor for growth.

But answers to some questions usually raise others and the information I have summarized above is no exception. The importance of vitamin B_{12} in nutrition is evidently not limited to the making of red blood cells, since it is required by *Euglena,* which has no blood. This suggests that it performs some fundamental function, probably common to all living organisms, but involved in the production of blood by the higher animals. What is that fundamental function? If there is little or no vitamin B_{12} in grass or grain, where does the B_{12} come from which is in beef liver? What is the origin of B_{12} in nature? How specific is vitamin B_{12}? Are there other substances which can be substituted for it? Why are people who have pernicious anemia unable to get B_{12} from their food as normal individuals do? These questions and many others will occur to you, if you think a bit about this interesting and important vitamin.



Stages in multiplication of Euglena

***Euglena* multiplies by dividing longitudinally.**

Each of these questions is a puzzle

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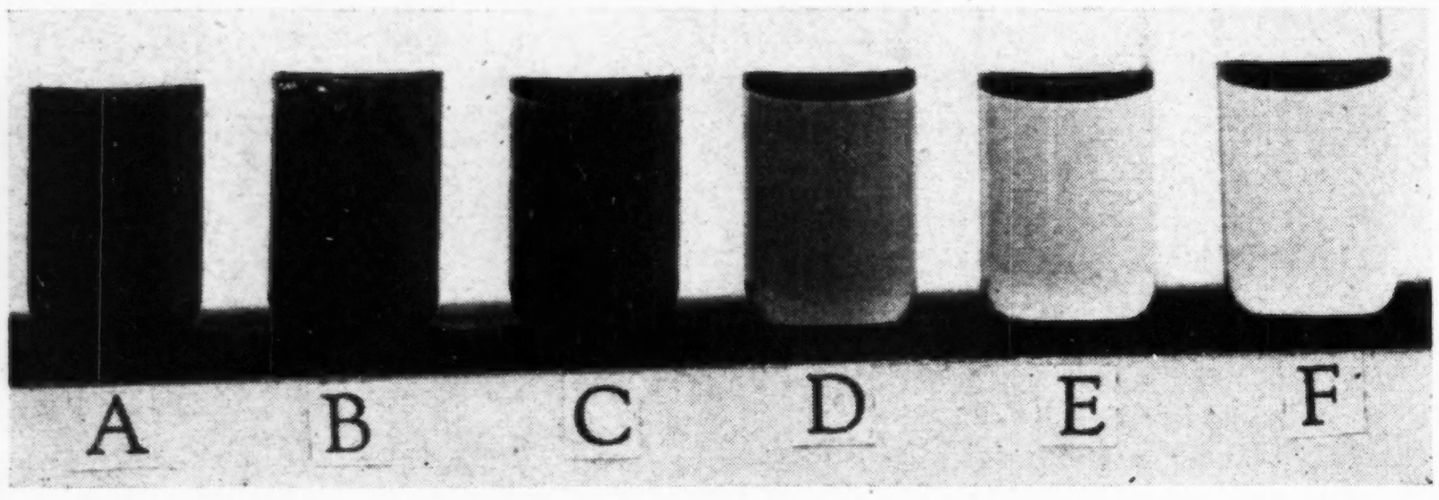
[1] Dobell, Clifford — ANTONY van LEEUWENHOEK and his "Little Animals," London. Staples Press Ltd., 1932, pp. 109-111.
[2] Probably the common green alga SPIROGYRA.
[3] Probably Rotifers.
[4] Almost certainly EUGLENA VIRIDIS.
[5] Mites.
[6] Now associated with the Haskins Laboratories, New York City.



***Euglena* tells by its growth how much vitamin B^{12} is present. Tube F, no B^{12}; E, 1 micromicrogram B^{12} per ml; D, 3.125 micromicrogram; C, 6.25 micromicrogram; B, 12.5 micromicrogram and A, 25.0 micromicrogram. 1 micromicrogram is 1 trillionth of a gram and there are about 500 grams in a pound.**

but its solution can't be found in next Sunday's "New York Times," neither can any man, even the most famous and distinguished, answer them for us. Where can their answers be found? We go to *Euglena* and ask it our questions.

Euglena gracilis var. *bacillaris* exhibits a quantitative growth response to crystalline vitamin B_{12} and the effects of one trillionth of a gram of B_{12} per milliliter can be regularly observed. So we can say to *Euglena*: Is there B_{12} in urine, blood, or any other natural material? Its growth gives us the answer and the amount of growth tells us how much B_{12} there is. So this useless little plant which can't be eaten, used to make clothing or to build houses or even included in a flower arrangement, which causes no diseases and furnishes no perfumes, spices or antibiotics, has become of value two hundred seventy-five years after Leeuwenhoek first saw it, and after many man-years devoted to its study. It is an illustration of how knowledge seemingly useless may become of value.

Using *Euglena* to answer our questions we found in our laboratories:

1. that many soil microorganisms make B_{12}.[7] In fact, a water extract of soil, one part of soil to two parts of water, contains about as much B_{12} as cow's milk.
2. that B_{12} has a high degree of specificity for *Euglena*. A few nearly related compounds will replace it but many other nutritional factors cannot be substituted for it.
3. that the tops of the garden and crop plants we examined contain very little or no B_{12}. The roots have more but very little as compared to liver and some other sources.
4. that clams, oysters and earthworms are rich in B_{12}. Shrimps do not have so much.
5. that some seaweeds contain appreciable amounts of B_{12}. This suggests that in countries like Japan and Korea, where little meat is eaten, the seaweeds used for food may aid in supplying B_{12}.
6. that some of the simple blue-green algae make B_{12} and that they must be regarded as one of the primary sources of this vitamin for animals which live in fresh water.

We concluded that the lower plants, (some kinds of bacteria, fungi and algae) are probably the original source of this vitamin in nature. This makes it unique, because all other vitamins with which we are acquainted are made by the common crop plants and fruits which are included in our diet.

Whenever the solution to a fundamental problem is discovered it often illuminates other problems which have puzzled us. Since B_{12} has been found to be made by many kinds of bacteria present in the soil and in the intestinal tract of animals, including man, we now know where the cow gets the B_{12} which appears in its liver and other body tissues. It is made by bacteria in the cow's digestive tract and absorbed therefrom. In this respect, sheep and other herbivorous animals resemble the cow. There are bacteria also in the digestive tract of man, the pig and chicken which make B_{12}, but these animals, for one reason or another, cannot obtain their B_{12} needs from this source. Unless man, hogs and chickens have B_{12} in their food, they grow poorly and develop various pathological conditions.

It has been observed that pigs do well on a B_{12} deficient diet, if the diet is supplemented with soil. Why is this? Evidently it is because soil contains B_{12} which is made by the microorganisms in the soil.

Chickens grow satisfactorily on a B_{12} deficient diet, if allowed to eat their droppings, but not if the droppings are frozen as they fall. Why? Because bacteria in the droppings make B_{12}; if the droppings are frozen, the microorganisms are inactive and no B_{12} is made.

It has been known for many years that there are sections of Scotland, Australia and the United States where sheep do not thrive; they develop characteristic and recognizable abnormal symptoms. It was found further that this abnormal condition could be cured by feeding the animals small amounts of cobalt salts and that the soil in these areas lacked cobalt. Cobalt injected into the tissues of the sheep was ineffective. Vitamin B_{12} seems to be the answer to this problem. You will remember that each molecule of vitamin B_{12} contains one atom of cobalt. The B_{12} which sheep need comes not from the food they eat, but from the B_{12} made by bacteria in the digestive tract of the sheep. If there is no cobalt in the sheep's food, the bacteria in the sheep's digestive system are unable to make B_{12} and the sheep suffer from a deficiency of the vitamin. The cobalt must reach the bacteria and that explains why cobalt fed to the sheep is more effective than cobalt injected into the body tissues.

I don't want to leave the impression that the *only* means of learning about B_{12} is by appealing to *Euglena gracilis*. That would be contrary to the facts. The information we have about this vitamin has been obtained by observations on man, experiments with chickens and other animals, by chemical methods and by the use of several microorganisms, in addition to *Euglena*, which also require this

(*Continued on page* 181)

[7] **The vitamin B_{12} available on the market is obtained now from microorganisms, not from liver.**

LONG LIFE FOR WOOD

By Carl Hartley

WOOD is the original construction material and continues by far the most widespread and versatile. While it is constantly being employed in new uses, at the same time it is being replaced for some purposes by steel, aluminum, concrete, and plastics, partly because of their supposed greater permanence. Yet wood needs no special protection in many situations in which steel would corrode. And, although in some uncommon uses wood deteriorates through chemical action, it is used, for example, for separators in storage batteries, where it is in contact with acid that ordinary metals could not tolerate. Wood may suffer from mechanical wear and weathering, yet under ordinary loading it is less subject than steel to the fatigue that results from continued vibration.

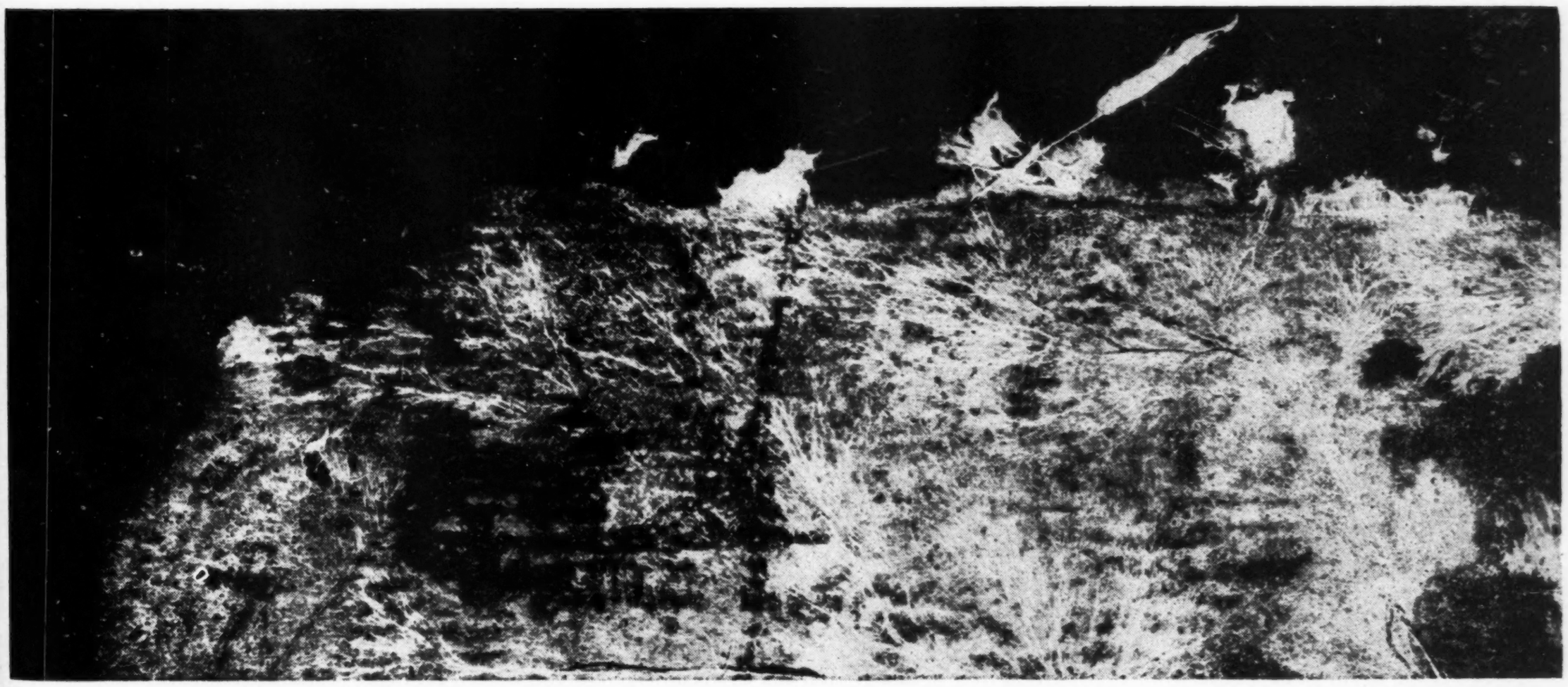
The principal enemies of wood are living organisms. There are several different groups which cause damage when conditions are right for them. The most important in the North Temperate Zone are the fleshy fungi that cause decay. There also are insects that depend upon wood for food. Wood in salt water is often rapidly destroyed by shipworms or teredos. These are not insects, but rather elongated relatives of the clams, which carve tunnels in the wood with their tiny bivalve shells. To them, wood is not a food, but a material in which to make homes, and protection against them is a peculiarly difficult problem.

Dry Wood Never Decays

In the majority of its uses wood is too dry to decay. There is actually no such thing as "dry rot," though, of course, wood that decayed while it was moist is often dry by the time that rot is noticed. Fungi do not ordinarily grow in wood unless the moisture content exceeds twenty-four per cent of its dry weight. Fortunately, in wood not exposed to frequent rain or other sources of water, the moisture content rarely goes above eighteen per cent, so there is a considerable margin of safety. Even in the moister parts of the Tropics, wood under cover remains free from decay. Most cases of decay damage, especially to buildings, are due to easily avoidable errors that have allowed the wood to be moist for long periods.

If one starts with properly dried lumber, most wood in buildings stays safely dry. Since builders have been working with the less decay-resistant sapwood that comes from our second-growth forests, most of them have learned not to put it in direct contact with the soil. Dangerous wetting of walls by rain is readily avoided by flashing and roof overhang, and by keeping dead leaves from clogging gutters. Cold weather condensation of moisture in walls and ceilings can be prevented by putting vapor barriers in the right places and keeping them out of the wrong places. The winter condensation moisture that endangers the sills and joists under basementless houses on wet sites can be avoided by the new method of simply laying roll roofing on the ground under the house, thus stopping the vapor at its source.

Paint is the standard protection against weathering, but is not to be regarded as a preservative in the ordinary sense of the term. In some situations, it helps prevent decay by



A wood-destroying fungus, feeding on the wood fiber that serves as reinforcement in this asphalt roofing.

keeping wood from soaking up as much moisture as it otherwise would during rainy periods, but for real protection it must be so well maintained that no cracks occur at joints. Paint delays the drying out of wood that has not been seasoned and thus may actually favor decay in buildings. Thick white lead has been found to have some value in application to the edges of porch floor boards at the time they are laid; and paint considerably lengthens the protection given by previous brush or dip preservative treatments.

Paradoxically, extreme wetness is another condition that safeguards a small part of the wood in service. The usual decay fungi must have a small but continuing supply of oxygen. Wood that is continuously under water, and piling driven into the soil below permanent water table, remain free from decay.

Natural Durability

There are some very important uses in which wood can not be kept either dry enough or wet enough for safety. These include boat hulls in which occasional leaks seem unavoidable; porches and steps of houses, outdoor furniture, bridges, etc., that are constantly exposed to rain; and especially posts, poles, piling, and railway ties that are partly in soil or water and partly in air. Naturally decay-resistant wood was relied upon for these situations. The heartwood of cypress, redwood, the cedars, teak, walnut, locust, mahogany, osage-orange, and some others is highly resistant, and that of white and chestnut oaks and southern pine and Douglas-fir is considered moderately resistant. No sapwood is really decay resistant. Heartwood of the durable species is usually darker in color than sapwood of the same species. These species owe a large part of their durability to toxic chemicals that are most abundant in the outer heartwood of the oldest trees. To a greater extent than has been generally realized, their relative freedom from decay has been due also in part to their resistance to the penetration of water. Intermittent wetting as by occasional rain does not wet the interior of the more durable woods. The long life of the best built boats and ships has been largely due both to the combination of natural decay resistance and the water repellence of the wood used and to ventilation inside the hull.

Conferred Durability

Because it is increasingly difficult to get enough naturally decay-resistant wood for all moist situations, there is an increasing shift to the less durable woods, with preservative treatment to make them durable. This has consisted mainly of treating the absorptive sapwood with chemicals that are poisonous to fungi and insects.

Napoleon Bonaparte unintentionally stimulated the early development of chemical wood preservation. His threat to England led to a hasty expansion of British naval construction in which non-durable and poorly seasoned woods were used. Perhaps the most striking of the resultant failures was the Queen Charlotte, 110-gun ship-of-the-line in which decay made such prompt inroads that, by the time she was ready for commission, she needed repairs that cost more than the original construction. Admiral Collingwood reported so much decay in his flagship that they had "nothing but a copper sheet between us and eternity."

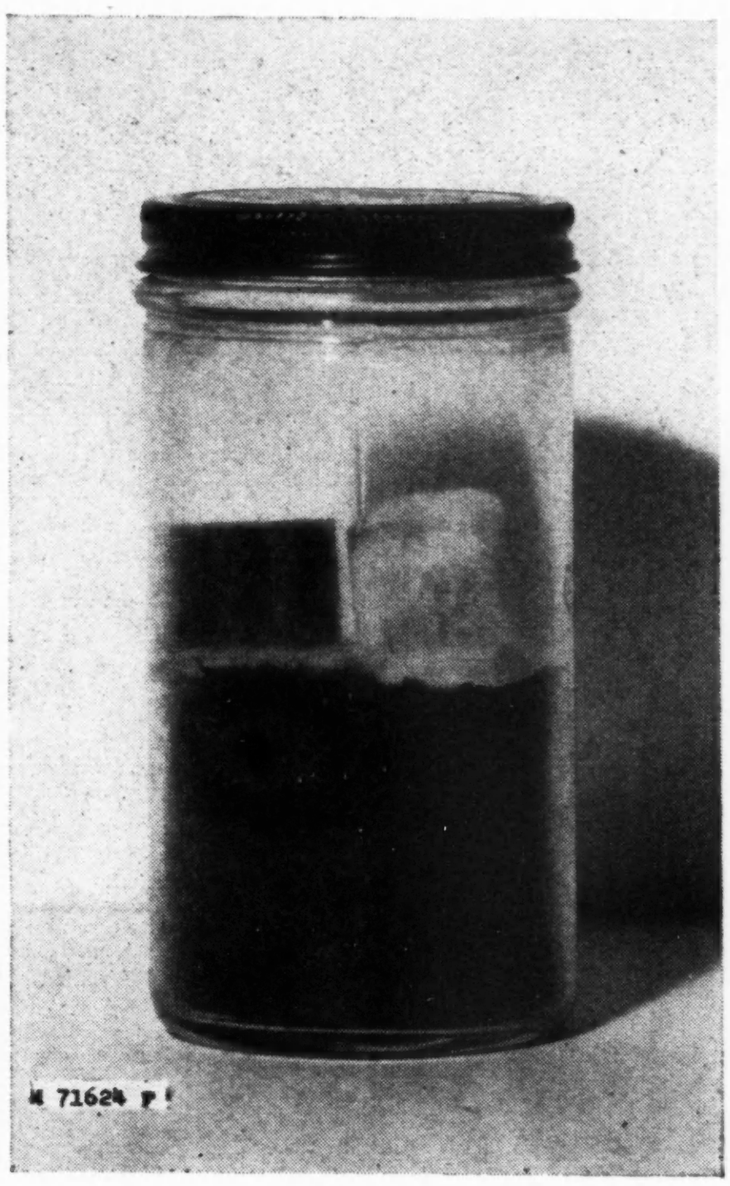
This focused attention on wood decay. People began to realize that the fungi that grew on wood had some connection with decay and to make systematic attempts to stop them. Mercury, zinc, and copper salts and coal-tar creosote all came into use as wood preservatives a quarter of a century before the first successful experiments in spraying live plants with fungicides. A large wood preservation industry has grown up, which has made a notable contribution to the usefulness of wood, and also to the conservation of an important natural resource. The tremendous expansion of railroads in the latter part of the nineteenth century and the mushrooming requirements for electric service poles

Microscopic threads of the common decay fungus, *Lenzites sepiaria*, in the cells of southern pine wood.

stepped up the drain on our durable timber species to a rate that could only have resulted in serious depletion. In the early part of the present century the situation was aggravated by the Asiatic chestnut blight. First recognized as a disease by the late Herman Merkel at the New York Zoological Garden and first diagnosed and publicized by W. Alphonso Murrill, then of The New York Botanical Garden, this disease cut out from under us the American chestnut, formerly the most important source of poles in the eastern United States.

Fortunately, the rapid development of wood preservation plants and improvements in their techniques brought into the picture for poles, ties, or both, the second-growth pines of the South, the black oaks and tupelo, and other species. Replacements for untreated northern white cedar poles were said to require twelve trees growing in the woods for every pole in the line. By developing treatments for lengthening the service life of cedars and bringing the fast-growing southern pines into pole use, the wood preservers have enabled our forests thus far to meet well the needs of electrical transmission. During the twenty years that followed World War I, chiefly because of wood preservation the annual requirements for railway tie replacements dropped from approximately two hundred fifty to less than one hundred per miles of line, a still larger contribution to the conservation of our timber supply.

Of the many materials that have been tried as wood preservatives, those that remain in use include the predominant coal-tar creosote, used on more than ninety per cent of the wood professionally treated; pentachlorophenol or copper naphthenate in oil; and the water-soluble preservatives containing compounds such as inorganic fluorides, arsenicals, and copper and zinc salts. The various water-soluble materials are used in ways that try to minimize later losses by leaching and avoid corrosion of metal fasteners; for this, the addition of chromates has become popular. It is difficult to find any one chemical that is sufficiently toxic to stop all the fungi. For this reason,



A method for determining amount of a fungicide needed to stop a decay fungus. Block on the left is impregnated with a chlorinated phenol at the rate of 4oz. per cu. ft. of wood. That at the right is untreated, and rapidly decaying.

mixtures of chemicals have found favor. Laboratory techniques for quickly testing the immediate effectiveness of various chemicals and combinations against decay fungi in wood are being improved, but predicting the permanence of the preservatives in service is not so easy. One of the possibilities for the future is chemical study of extracts of the most durable woods, to learn more of the composition of their natural protective components. These woods contain compounds that are not only sufficiently able to stop fungi, but in the quantities present are unobjectionable for most uses, and so low in solubility and volatility that they last in the wood for a long time. It would scarcely be possible to extract them in quantities large enough to put into wood on a large scale, but it might prove practicable to synthesize some of them commercially.

One of the chief limitations on the effective use of preservatives is in getting them deeply enough into the wood. Brush or spray treatments in most situations have little value. They can actually lead to increased damage by creating such a false sense of security that the user fails to protect the wood from moisture as well as he might. The best treating procedures involve pressure and are practicable only at large commercial plants. Some lumberyards carry pressure-treated lumber in stock.

When it is impracticable to get pressure-treated material, worthwhile protection can be secured by non-pressure methods, particularly for lumber not over two inches in thickness. A soak in a hot bath, followed by a cooler one, can result in high absorptions from the cool bath. For small fence posts or for inch lumber, a cold soak will do a great deal on easily penetrated wood like sapwood pine. Where nothing better can be done, porch floor boards and the bases of porch pillars should be given an end dip for a few minutes in a preservative, and the surfaces of the floor boards should be given a heavy brush treatment. Most window sash and some window frames are given a light preservative treatment at the factory, a very desirable procedure. This, however, should be combined with back-puttying, and ventilation or the use of storm sash to keep winter condensation of moisture on the inside of the window from soaking into the bottom of the sash. Preservative treatment of sills or plates on low foundations is a desirable supplemental safeguard. A short soak of ends of first-floor joists is one of the readily practicable on-the-job treatments where commercially treated lumber is not available. If fungus-stained siding and exterior trim must be used, a brush treatment of sides and dipping of ends in a preservative after the pieces have been cut to size, is a particularly desirable practice. The end-grain exposed in joints is a common entry point for water and decay, but fortunately is also the point where preservatives most readily penetrate. Preservatives are available which do not interfere with subsequent painting of the wood. However, preservative treatment is not needed for wood that is well isolated from the ground and is not reached by rain or condensation water, as in most parts of buildings.

The question often arises as to what can be done for wood that is

(*Continued on page* 186)

The greenhouse was designed as an integral part of the Matthiessen's home in Stamford, Connecticut.

The Matthiessen Greenhouse and Garden

By Ruth V. Caviston

IN winter, when trees are bare and neighbors ski on the snow-covered slope beyond the Matthiessen home, they catch a blurred glimpse of rich warm colors as they race downhill. It is incongruous to the skier, conditioned to expect dazzling white, to see gay daisies and sturdy geraniums in riotous bloom. However, the greenhouse display of Mrs. Erard A. Matthiessen of Riverbank Road, Stamford, Connecticut, invariably holds the eye.

It is no longer extraordinary for people to garden in glass houses, but this greenhouse is different for two reasons. First, it was designed as an integral part of the house, and second, the side of the greenhouse that connects with the potting shed in the basement is a stone wall covered with ivy and mosses.

When the Matthiessens moved to Stamford, the house on their property was small and very, very old. But Mr. Matthiessen is a professional architect and his additions to the house have made it most attractive. About ten years ago a small greenhouse was added. This was planned to fit in with the overall design of the home. The greenhouse is approximately ten by twelve feet and glass-enclosed on three sides. The fourth side, which has a door leading from the potting shed into the cellar, is built of weather-beaten, earth-packed stones taken from an old wall on the property. The crevices between the stones are planted with small ferns, ivies, and mosses. This unusual arrangement furnishes a decorative touch to the greenhouse.

The location of these small wall plants presented a difficult watering problem. At first Mrs. Matthiessen used a hose, poking the nozzle between the stones. Although the pres-

sure was extremely mild, it was sufficient to wash soil from between the stones. Before much damage was done, however, the problem was solved. A plumber installed a thin pipe, pierced with many tiny holes, across the top of the wall. This provides a gentle spray of water which gradually seeps into the crevices. Within an hour the wall plants are watered sufficiently and with no effort on Mrs. Matthiessen's part, other than turning a faucet handle.

Mrs. Matthiessen prefers to grow "plants that are fun and easy to manage," though paradoxically, she has better luck with the more difficult begonias than with common varieties. Her greenhouse benches, for the most part, hold begonias, geraniums, impatiens, and fuchsias. Nearly all of these plants can be traced back to stock that filled the benches ten years ago, although there are exceptions. One is a beautiful begonia that a carpenter and fellow-gardener gave her a few years ago. Another is a "five-and-dime store" Christmas cactus which was given to Mrs. Matthiessen by an aunt after she had grown it many years. Dozens of cuttings have been taken from this plant and distributed to other gardeners. She has had good luck, too, with department-store echeverias.

Mrs. Matthiessen prefers to grow plants that are easy to manage, so she fills her greenhouse benches with her favorites, geraniums, begonias, and fuchsias.

Mrs. Matthiessen's reason for building a greenhouse was to have plants in bloom during the winter with which to decorate and brighten

Mrs. Matthiessen is working in the potting shed adjoining her greenhouse.

her home. Most of the plants she grows are brought into the house at one time or another and placed in a room where they will be most effective. This gardener knows the value of unusual containers, too. Two beautiful old silver stirrups from Peru hang on the living room wall, with grape-ivy planted in one and a trailing begonia in the other. Ordinary ivy has a special appeal when grown in a beautiful white sea shell.

The advantages of this greenhouse are reaped by friends of Mrs. Matthiessen in the vicinity. They know they are welcome to borrow her plants when their own homes require a special spot of color—when dinner guests are expected, for instance. Then, too, neighbors sometimes stop by to see if Mrs. Matthiessen has room for their plants for the time they will be away from home. One lady leaves her beloved lemon plant in the greenhouse for safekeeping several months each year.

Although the greenhouse is Mrs. Matthiessen's special joy, she does not neglect her outdoor garden. The walled garden is terraced out of a hill and is about twenty yards long. It is devoted to spring- and fall-blooming plants only, because the Matthiessens are away all summer. From a pergola on the lawn one can see the scalloped borders bright with columbines, irises, and pansies. The garden was designed by Helen Swift Jones, the landscape architect, who also planned the foundation plantings around the house. A laburnum by the door on the side of the house is strikingly beautiful in late spring. Its long clusters of yellow flowers hang gracefully, in vivid contrast to the darkness of its leaves.

Mrs. Matthiessen is also interested in birds, a passion which comes as second nature to many gardeners. The millet and canary seed she mixes and places in outdoor feeders attract all the local birds, including colorful goldfinches, purplefinches, orioles, and blue jays.

With the exception of one short course at Columbia, where she "learned how to make cuttings," Mrs. Matthiessen has not studied gardening formally. She does read horticultural and gardening books and magazines. She believes, "You either are or you aren't interested in plants. If you are interested, you'll learn what you want to know about them one way or another." Mrs. Matthiessen is interested.

Spring- and fall-blooming plants are featured in the walled garden, built on a hillside.

WINTER PROTECTION -

for Cultivated Plants

By Edwin Beckett

SO many of our popular cultivated plants, both ornamental and utilitarian, are grown under conditions far removed from those which prevail in their native habitat, or are planted in localities where the winters are much too cold for their well-being, that it becomes necessary to provide winter protection. Native material, generally, does not need protection, although this rule is not entirely reliable in extremely cold or bad winters, or if the plant has been transplanted recently or is subjected to unnatural conditions, for example, the growing of naturally shade-loving individuals in open situations. It is the border-line plants, those which are almost hardy and for which there is always a desire to cultivate by virtue of the fact that they are more or less rare, that call for special attention. Of course, plants which are definitely tender are taken care of in the usual manner, either by storage in frost-proof buildings, in cellars or greenhouses.

Where winters are reliably constant and an early snowfall is usual, and providing the snow persists right through the winter, many of the chores and evils of covering are removed. Snow forms an excellent covering and proves a good insulator. A great asset, too, in the prevention of winter damage to plants is adequate drainage. Many plants will survive comparatively low temperatures in ground where there is a good run-off, or satisfactory underdrainage, which would perish in spots that are water-logged or even moderately retentive.

It is a fact that a great deal of the plant material calling for attention suffers not from the low temperatures of winter but from its uncertainties. The alternate freezing and thawing of the ground, which is due to fluctuations in temperature and is generally prevalent throughout much of the eastern United States, plays havoc with many plants, especially those possessing a shallow-rooting system. This type of plant calls for particular attention, for it is necessary to provide shade for the ground, not to attempt to warm it but to keep it cold so that once frozen, it remains so. Under this category comes much of the herbaceous material, bulbs, rock plants, biennials. Many plants of this type which are of a deciduous herbaceous character, may even be crowned to advantage with soil or ashes; this forms a coating and prevents thawing at the roots. In most instances, however, mulching with a littery material sufficient to shade the ground thoroughly and of an open enough nature to admit air is sufficient.

Except in the case of a soil mulch, the covering material is not put in place until the ground has become thoroughly frozen and at such time as is quite probable that cold weather will continue. Strawy, littery material covering plants in soft ground and in soft weather is an inducement to field mice to go to work with disastrous results. The use of leaves, particularly the large flat leaves, is not recommended as they tend to mat together when wet and are unsuitable, particularly for evergreen herbaceous material such as heuchera. Should snowfall occur before the covering is in place, wait for a thaw and then a freeze before covering. Continued snow covering is excellent. Any plants of doubtful hardiness may be removed to coldframes or pits in time to become somewhat established, provided there is a light shading of litter within the frame or evergreen boughs over the glass.

The bush types of roses, such as the hybrid perpetuals, hybrid teas and floribundas, should be shortened slightly, if going into the winter with long canes, to prevent their being whipped by winds. Hilling the plants to a height of ten inches or so above the normal ground level is necessary in localities where winters are severe. This may be accomplished by drawing the soil around them with a hoe or by adding soil to the bed for the purpose. After the ground has become thoroughly frozen, a light litter may be scattered over the soil and among the plants to provide shade. Pine boughs are excellent for this purpose as they admit air and also provide the necessary shade. Generally in climates reaching zero temperatures, the hybrid teas and floribundas kill to the ground line. The hilling-up process assures sufficient live wood from which growth will commence in spring.

Many of the climbing roses are somewhat tender, too, and call for slightly different treatment. If relatively hardy, they may be cut from their supports, tied in bunches, wrapped with straw, and then covered with burlap or waterproof paper. Those which may need additional protection should be laid down to the ground and covered with soil. This, later, may be covered with litter as recommended for the hybrid teas. The large shrub roses are, as a rule, of the hardy type, but will come through the winter better if drawn together with twine and attached to a stake to prevent being whipped and broken by the weight of snow.

Tender shrubs, such as caryopteris, vitex and the like, should be hilled as far as possible, the boughs tied together and wrapped. Figs, the population of which seems to be increasing, are best tied into as small a compass as possible, wrapped well with straw or cornstalks, and provided with a waterproof cover. The lack of moisture about the branches seems to be a deciding factor in carrying these over the winter.

Evergreens, especially the broad-leaved kinds, need help in many areas. Boxwood, both the sempervirens and the dwarf suffruticosa

variety, is particularly susceptible to sun injury if left unprotected. This damage occurs mainly in the early spring when the sun begins to creep higher in the sky. If the ground is frozen and sufficient water is not available at the roots, rapid transpiration from the leaves, with no source from which to replace the water loss, can cause bad burning of the foliage. The preventive measures call for shade of some kind, not too dense and allowing a free circulation of air, and a thorough soaking of the soil to ensure an adequate supply of moisture at the roots. Depending on the locality, some of the evergreens—ilex, rhododendrons and yews of the baccata section—call for shade. In fact, most broad-leaved evergreens are prone to spring burning, when removed from their native quarters.

In situations exposed to winds some of the forest evergreens, particularly hemlocks, are apt to be affected. This is most noticeable on trees which have been moved recently. Two particularly susceptible ones are *Abies concolor* and the ordinary hemlock. A windbreak of boughs, cornstalks or burlap will make a tremendous difference in this respect.

As a general rule, winter covering for semi-hardy plants and for those which "burn" from lack of moisture to replace the loss through the leaves in the late winter or early spring, is more in the nature of shade material. There are instances where it is necessary to exclude frost from the ground entirely in order to preserve plants, but these subjects are handled with a greater degree of safety if removed from the ground in the fall and placed in frost-proof structures. Should such protection be necessary, it is, of course, imperative that sufficient covering be used to take care adequately of the temperatures of that region. Needless to say, boxed or enclosed covering is preferable and it must be kept dry; its insulating quality is considerably reduced if it becomes wet or soggy. This semi-hardy material may be cared for in deep pits or frames, cellars or frost-proof buildings. Frames and cellars are to be preferred, as temperatures remain more or less constant and the humidity higher than in buildings above the ground, which would require some artificial heat. It is remarkable the protection afforded by coldframes when built with the sash a few inches above ground level and the whole interior some five or six feet deep in the ground. With a quilt or waterproof mat on the glass during cold spells and nights, and the natural temperature of the ground below frost level providing added warmth, coldframes become practically frost-free structures in which may be stored a number of tender plants of both hard and softwood character that would normally require cool greenhouse treatment.

It is advisable, of course, to ventilate these types of covering, as also coldframes of all kinds, when used for winter storage, in order to eliminate excessive moisture. Midwinter, through December and early January, is the most difficult period. Care, too, must be taken to allow for early starting of the plant material so that it does not become "drawn." Most plants so stored feel the effects of increasing sun warmth readily and are prone to start into growth early.

A moot point in the business of winter protection is the mulching of rhododendrons and similar broad-leaved evergreens. If a mulching of dry leaves is applied each fall, as is provided in the wild state, and left to provide ultimately a covering of leafmold, it should be sparingly done. Personally, my opinion is that it would be better to apply the leafmold already prepared. A coating of two or three feet of leaves applied to plants in such a climate as is experienced in New England is of doubtful value. Following heavy rains and snow, it becomes compressed and sodden and is an insufficient insulation to prevent the ground from freezing, and retards the warming of the ground in spring when it is necessary to have a supply of water available to the roots. A mulch of this character should be removed very early or omitted. Of course, if it were possible completely to prevent frost reaching the ground, it would be an advantage, but the mulch would still need to be removed early to enjoy the benefit of the sun heat.

The proper protection of plants in winter is determined by observation of conditions and the exercise of a few basic rules. Location and prevailing wind currents have much to do with the problem of whether a plant will survive the winter. Soil texture, the retentiveness of the soil and drainage, as mentioned above, have a bearing as to the necessity of a protection for a certain plant. I have seen established trees of *Magnolia grandiflora* and *Camellia japonica* which have withstood a short period of zero weather; and know other instances of recognized half-hardy material surviving 20° below zero when growing under conditions that provided adequate drainage.

Euglena & Vitamin B_{12}

(*Continued from page* 173)

vitamin for growth. Nevertheless, this little plant has proved to be a useful tool and with its aid we have learned a good deal we might not have otherwise learned about an important nutritional factor.

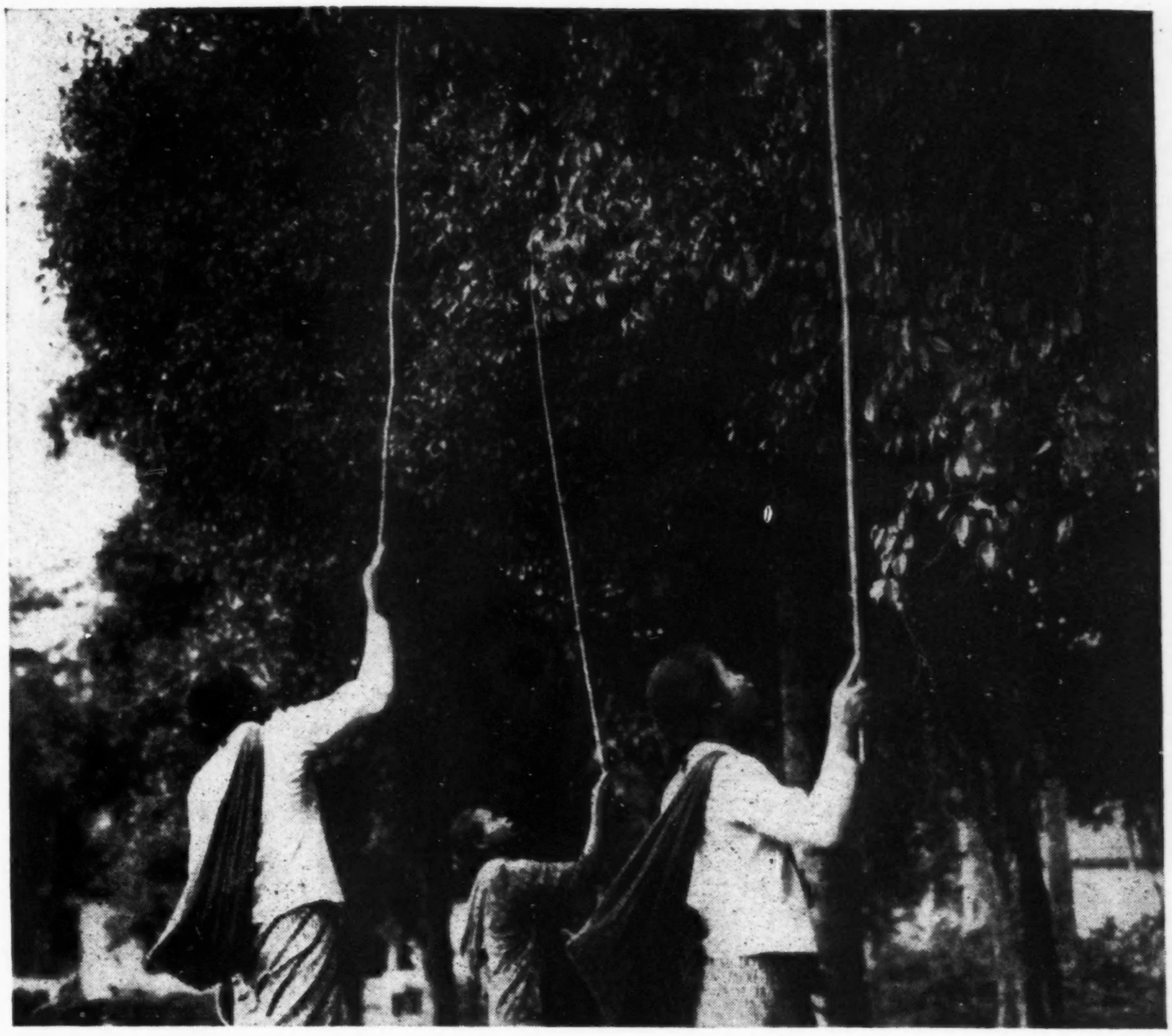
Are there any other plants which, like *Euglena,* are now considered useless but which may be found to be of value? Certainly there are. The potentialities of the plant kingdom have as yet scarcely been touched. About three hundred and fifty thousand kinds of plants are now known; we are sufficiently well acquainted with only a small fraction of these to appreciate their uses. In addition, there are probably more than one hundred and fifty thousand kinds of plants still to be discovered, described and made known to science. Any one of these may become of value to us, perhaps in some unexpected way.

To make them of value we must know more about plants, the kinds there are, their relationships, life habits and genetics, their diseases, physiology and chemical make-up. This will take men with inquiring minds, with the proper aptitudes and training, with time and financial support and, in addition, a realization of the importance of plants and of the fact that knowledge of the world about us, provided it is fundamental and valid, may have applications in unforeseen places.

SPICES --

Nature's Gift to Man's Enjoyment of Eating

By Bernard L. Lewis



Indonesian natives are shown picking nutmegs from trees with *gai gais*. Nutmeg and mace come from the same fruit.

EARLY in World War II the United States Army Quartermaster Corps set out to discover the value and importance of seasoning materials in rations. Two groups of soldiers were selected, each identical in weight and physical condition. Group A was fed unseasoned food. Group B was fed temptingly spiced rations. After three days of labor, Group A was unfit for further work, while Group B was in excellent condition. On the basis of this, the spice trade association was declared an essential industry by the War Manpower Commission in World War II.

In August, 1951, the United States Navy released the results of an experiment in which it was shown that a submarine crew was kept in good spirits and physical condition by being fed spiced foods on a protracted underseas voyage. The longer the men were out, the more highly spiced food they demanded.

The value of spices has long been known, and they have been growing in stature and importance in recent years after a period of comparative neglect. Today you can hardly pick up a newspaper or magazine whose food page does not list recipes which specify one or more spices, seeds or herbs. There has been a reaction to the "bland" food fad of the twenties, and a book published in August, 1951, "Good Food for Bad Stomachs," by Dr. Sarah M. Jordan, head gastroenterologist at the Lahey Clinic in Boston, even specifies many spices and herbs in the diet of ulcer patients, a suggestion which would have been scorned a few years ago.

Strangely enough, although the value of spices has been proved empirically throughout the ages, little of an analytical nature is known about them. They have so far even defied a specific definition. The word "spice" is often used generically to include herbs and aromatic seeds.

Spices, according to the best available definition, are the roots, bark, stems, leaves, buds, or fruit of aromatic plants which grow in the tropics or semi-tropics. For example, cloves, ginger, nutmeg, black and white pepper.

Herbs are the leaves of aromatic plants which grow only in the temperate zone. For example, bay leaves, sage, marjoram, chervil.

Seeds refer to the seeds, and sometimes the small fruit, of plants which grow in both the tropical and temperate zones. For example, mustard, anise, caraway and cardamom.

Until just a few years ago, very little research had been conducted to determine the value and attributes of spices. In 1937, Dr. Albert Szent-Gyorgi, Hungarian scientist working on a Rockefeller Foundation grant, isolated Vitamin P in paprika and won a Nobel Prize for his efforts. Only isolated research had been conducted until 1947, when the American Spice Trade Association started the first integrated research program on spices. Investigations are now being conducted on the medical aspects of spices, on their antioxidant or preservative value and on their applications in food processing industries.

What no one will probably ever determine is the exact age of man's use of spices. Estimates vary from two thousand to twenty thousand years. It is probable that prehistoric man learned how to use aromatic leaves not long after he learned to cook his food. The *imu,* one of the most primitive methods of cooking, involves wrapping meat in leaves and burying it in an ember-lined pit. The leaves impart their flavor to the meat, and it is likely that once man discovered this, he sought other leaves to vary the flavor.

Spices are the only natural products in the world that can lay claim to such a vibrant and romantic history. The earliest surviving writings record the fact that spices were avidly sought and traded during the dawn of civilization. Spices ranked with gold and precious jewels on the lists of the early explorers and motivated many of the greatest voyages of discovery, including those of Magellan and Columbus. Wars were fought over control of spice sources and routes, and brutal monopolies were maintained to preserve the gains made. For the past five centuries the most powerful nation in the world at any given time has also been the nation that controlled the spice trade. In this connection it is interesting to note that control of the spice trade shifted from Great Britain to the United States in 1937.

Spices played an important part in the early history of the United States, in dramatic chapters which have been largely overlooked. Our merchant marine, and the first American fortunes, were founded in the spice trade. The port of Salem, in Massachusetts, was the center of this commerce from 1799 to 1846, rising to its highest point in 1810 when import duties on spices paid for five percent of the expenses of the entire national government. The trade waned when attacks of pirates on American ships made these journeys too hazardous without protection from the Navy; Congress did not wish the Navy to interfere in foreign waters.

Throughout history, most of the world's spices have come from a comparatively small area in the Asiatic tropics, which produces black and white pepper, cinnamon and cassia, cardamom, nutmeg and mace, cloves, ginger, turmeric and other spices. Vanilla, the capsicums, and pimento or allspice are natives of the American tropics, while northern Europe and Asia produce mustard, caraway, coriander, cumin and others.

Today, spice sources have changed considerably. Nutmeg, mace, ginger, cardamom, paprika, mustard, turmeric and other spices are grown in the western hemisphere. The United States grows most of its own mustard seed, and we have succeeded in growing paprika, chili peppers and many herbs, although sage, the most popular commercial herb, is still imported from Dalmatia because the American product has a turpentine flavor. Mexico produces allspice, anise seed, chili peppers, cumin seed, oregano, saffron and its native vanilla.

Despite these changes in sources, we still depend on Asia for many of our most important spices. True pepper, or *Piper nigrum,* the world's most important spice, has never been grown commercially outside a thousand mile radius from the port of Singapore. The United States Department of Agriculture has been experimenting with pepper cultivation in Latin America without success.

Pepper usually accounts for about half the world's consumption of spice, but World War II's effect on pepper production is still being felt,

Drying washed peppercorns on cement yards in Malabar on the coast of India.

with production down about seventy percent of pre-war. The reason for this is simply the failure of Indonesia to get into production after the devastation of pepper plantations during the Japanese occupation. Indonesia formerly produced eighty percent of the world's crop.

Spices, seeds and herbs are grown in one of four ways:

1. As plantation crops, in the case of those trees or shrubs which yield for many years, such as nutmeg and mace, cinnamon and cassia, and cloves, etc.

2. As garden crops, where the plant yields for only a few years and is cultivated with other permanent crops. This would include pepper, ginger, and the capsicums.

3. As field crops, grown in rotation with other crops, such as poppy seed, mustard, caraway, and coriander.

4. As naturally occurring or wild plants, such as sage.

Mace and nutmeg are usually mentioned together for the reason that they occur together in nature. Both the mace and nutmeg are part of the peach-like fruit of a tall evergreen tree whose leaves closely resemble those of rhododendron. The nutmeg is the seed of the fruit, and the mace is the aril or fleshy seed covering.

Cassia and cinnamon also require some explanation. When the American homemaker purchases a package of cinnamon, she is actually buying cassia. Cassia and cinnamon are the bark of different plants which are related botanically. Cinnamon, more delicate in flavor, is grown only on the island of Ceylon. Cassia, more abundant and stronger in flavor, therefore the better buy, is grown in China, Burma, Indo-China and Indonesia.

Black and white pepper come from the same berry. Black pepper refers to berries picked before fully ripe, dried, cleaned and shipped. The entire berry or peppercorn is ground. White pepper refers to berries left on the vine until fully ripe, when the outer hull or shell has partly separated from the white center. The ripened berries are steeped in water to hasten the removal of the hull. The hulls are removed, the white peppercorn is washed several times, dried and shipped. The process of hull removal is known as decortication. The white pepper is preferred for use in such condiments as mayonnaise, where the black specks would be objectionable. White pepper is not as sharp nor as pungent as black pepper.

Black and white pepper are true peppers, as distinguished from the capsicums or chilies which are sometimes referred to as "red pepper." The capsicums, of which there are about fifty forms, were originally natives of Central and South America and are considerably hotter than *Piper nigrum* and its botanical relatives.

Allspice, whose flavor resembles a combination of cinnamon, nutmeg and cloves, is sometimes thought of as a blend of spices. Actually, it is a single spice, native to this hemisphere. It is referred to in the trade as *pimento,* not to be confused with *pimiento* which is a species of red pepper used as a garnish. To add to the confusion, it is sometimes called Jamaica pepper, although it is not a pepper. Allspice is used ground in baking, is excellent for seasoning pot roast, and is an important ingredient of mixed pickling spice.

The use of spices in the art of cooking is undergoing a renaissance in this country. The reasons for this are highly complex and are traceable to a food revolution which has taken place in the United States within the past decade. The pressure of a growing population upon diminishing fertile and tillable acreage has helped to cause generally higher food prices, which in turn has caused homemakers to seek ways of improving the flavor of inexpensive foods. World War II rationing also contributed to a focus of attention on the value of spices in contributing to the flavor of daily eating.

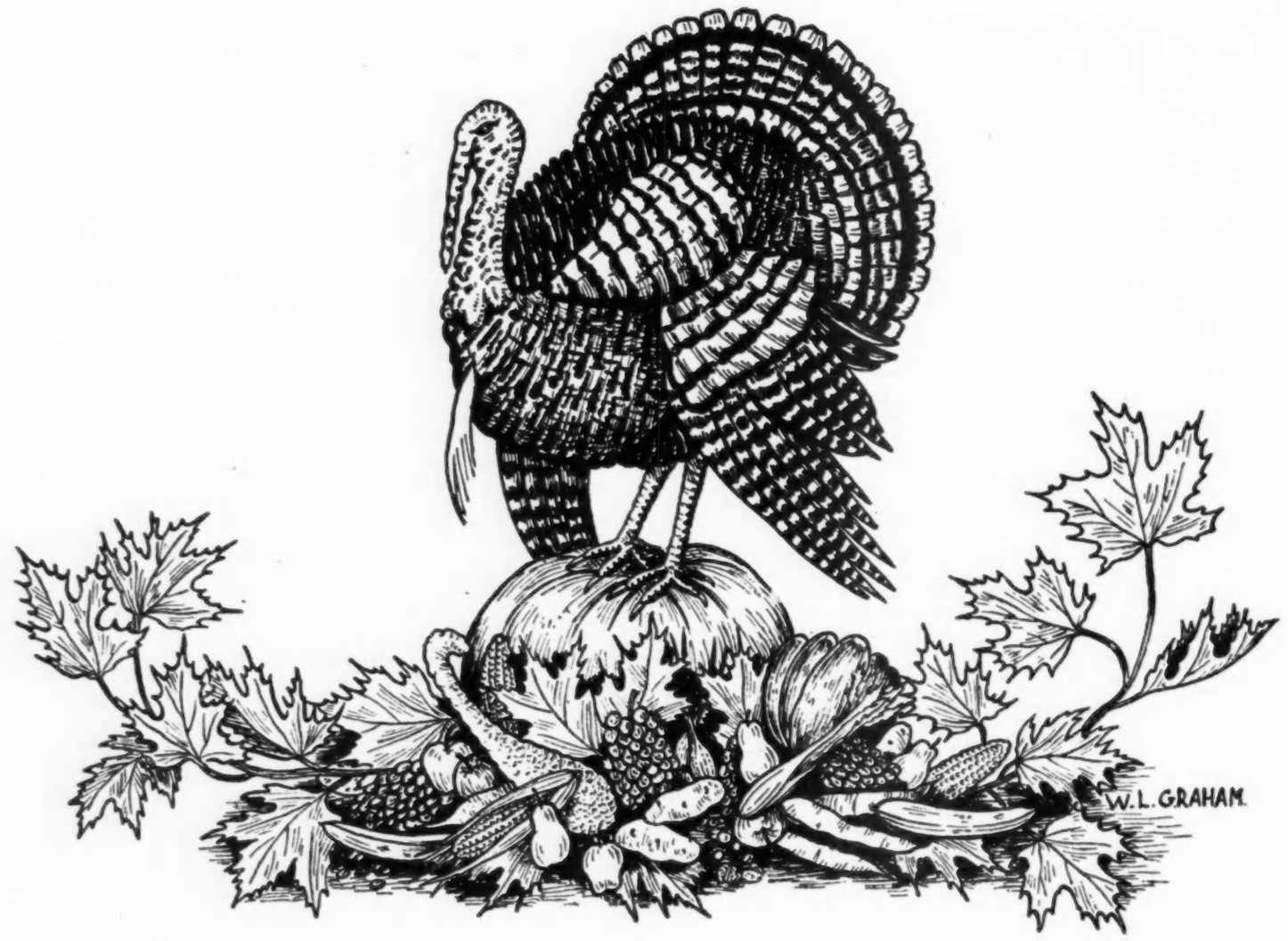
Natural spices seem to be as important to man as other natural foods, for they have endured the vicissitudes of history and have emerged stronger than ever in an age in which everything natural is being coralled and harnessed by the laboratory.

An Indonesian spice merchant displays (top) mace, (center left) cloves, (lower left) nutmegs and cinnamon.

For the Younger Generation of Gardeners

ALL-AMERICAN THANKSGIVING DINNER

By G. L. Wittrock



CHRISTMAS is associated with gifts and toys, New Year's Day with ringing bells and tooting horns, Easter with colored eggs and rabbits, and Thanksgiving with turkey and plenty of good "eats." All the tasty foods and sweets that you and I like are to be had on this fall holiday. We learn in school that it has to do with the Pilgrims in America; that it was the day they chose to feast and to show thanks for having come to the new country with its privileges of freedom. While there is no certain evidence of what was served by the Pilgrims on the first Thanksgiving Day, a letter has been uncovered, believed to have been written by Gov. Edward Winslow, which does give us some information. It states that four hunters were sent out and that they bagged enough fowl in one day to serve the large party for a week. The Indian Chief Massasoit and members of his tribe joined this first Thanksgiving party for three days; they brought with them three bears to be prepared and cooked for the feast. But no mention was made of turkey, so we do not know for sure if our Pilgrim forefathers enjoyed this fowl at that Thanksgiving dinner three hundred years ago. We imagine they did, however.

Would you like to look in on one of those real American Thanksgiving dinners? It is much more American than you may think. Not only is the holiday an American tradition, but the food served is almost entirely of American origin, inherited from American Indians. Many of these foods are now accepted and served throughout the whole world.

First of all, let us look at the decoration we usually find in the center of a dining room table on Thanksgiving Day. A large cornucopia or horn of plenty may be placed on a spread of autumn-colored oak leaves. From the throat of the horn there seems to pour out colored Indian corn, bright yellow and mottled squash, and small orange-colored pumpkins. Red and green peppers with yellow, pink, and red tomatoes add to the color. Some horns may also have edible fruits and nuts gushing out. This decoration, remember, represents food plants of strictly American origin.

Dinner may start with an appetizer such as fruit cocktail or tomato juice. Tomatoes are of American origin and actually were cultivated by the natives centuries before Columbus discovered the New World. Yet do you know that people were afraid to eat this delicious healthful fruit? They considered it poisonous. The tomato was known for a long time in the eighteenth and nineteenth centuries as the "love apple," a poisonous fruit that was tabooed.

Now for the main course, the turkey and its trimmings. Have you ever wondered how the turkey got its name? When Columbus left the Old World to find another route to the Spice Islands (East Indies), he finally sighted land, embarked and was welcomed by the Arawak Indians of San Salvador of the Bahamas in 1492. This hospitable, peaceful and nearly civilized group of Indians welcomed Columbus and his crew and gave offerings of foods that they cultivated and the animals they had domesticated from the wild. As trophies, Columbus took some of these strange foods back with him to the Old World — such foods as pumpkins, squashes, and maize, and a domesticated bird he referred to in his reports as the "Fowl of the Indies."

The Turks, at that time, were very aggressive in conquering much of the Mediterranean region up to the Danube River and on the northern coast of Africa into Morocco and southern Spain. They obtained some of the seeds of the strange plants for cultivation and the fowl for domestication and took them back to Turkey. In 1542, exactly fifty years after Columbus landed in America, the German botanist, Leonard Fuchs, published a book of knowledge on the plants and animals known and in use in Europe.

Fuchs included in his book an illustration of the "Fowl of the Indies," which had been published twenty-five years earlier by Konrad von Gesner when he described the bird as the "Indian or Calcutta Fowl." This illustration leaves no doubt that he was describing a turkey gobbler. Not having a Latin name and assuming that the bird originated in India, Gesner proposed a name to indicate that the bird was a cross between a guinea-hen and a peacock. But the Gesner name was apparently not accepted, and the bird was known throughout Europe as the "Fowl of Turkey" or the "Turkey Fowl" or the "Turkey Bird." Fuchs referred to the bird as the "Turkey Fowl." Gradually, the word "bird" or "fowl" was dropped and it became simply "turkey."

Fuchs also included illustrations labelled "Turkish cucumber" and "Turkish corn." The cucumber is our American pumpkin. On the Turkish corn, Fuchs comments: "The plant here considered has been brought to us only recently from Turkey, Asia and Greece; therefore it is called Turkish corn." This is our Indian maize.

To return to our dinner, the turkey stuffing or dressing may be made with chestnuts or wild rice and seasoned slightly with cayenne pepper. The vegetables served may be string or kidney beans, potato, sweet potato, lima beans, squash, or succotash—an Indian recipe which consists of green maize and beans boiled together. Pilgrims learned about this dish from the Indians, who also taught them to freeze the mixture as a method of preserving. A piece was chopped off as needed for cooking—an early method of preparing frozen food. A salad also may be served at the Thanksgiving Dinner and if it includes avocado pear with peanut oil as part of the dressing ingredient, it represents more plant material of American origin. Some of the food may be garnished with a reddish powder-like substance or paprika, a mild decorative spice. What about cranberries? Well, the delicious sauce or jelly made from these berries was known in the Old World where the European species was used. Today, the American species is so much more superior in quality that it is the only species used.

And now comes the final course, the dessert. Pumpkin pie is synonymous with Thanksgiving; it is almost a must. Ice cream may be included but remember that while ice cream is strictly American, it is something we did not inherit from the Indians. Ice cream was developed through Yankee ingenuity in the eighteenth century. However, the Indian contribution to ice cream may be the flavoring used. Vanilla is obtained from the bean of an orchid native in Central America; chocolate is from the seed of another tropical American plant; in fact, the species from which we gain this delightful flavor has so long been in cultivation by the American Indians that, like Indian corn, the wild parents are not known. Pineapple and the old standby strawberry are always favorite flavors; in fact, strawberry is strictly American in origin. True, there are wild species of the strawberry in the Old World and they were known but rarely eaten. It is our eastern American species that has the delicious flavor and is one of the parents of the many hybrid strawberries we have today.

After enjoying this typical American dinner, we shall find some of the guests wandering into the living room to enjoy the fire burning in the open fireplace. There they may be served with more American food —popcorn to be popped and bowls of nuts to be cracked and eaten. These nuts may be brazil, peanut, black walnut, hickory, pecan and, not too many years ago, our American chestnut. The host may pass cigars or cigarettes—tobacco is another inheritance from the American Indians.

So this typical American holiday comes to an end. May it close with a feeling of sincere thankfulness, the true spirit of Thanksgiving.

Long Life for Wood

(*Continued from page* 176)

already infected. If the source of moisture can be located and cut off, the decay will soon stop. Where there is any doubt about this, infected wood should be removed and the neighboring wood and masonry surfaces as well as the wood used in the replacements should be given as much preservative as it is practicable to get into them. In some cases, a little ingenuity on the part of a home owner will make it possible to drip an oil-soluble preservative dissolved in kerosene, very slowly on the wood or run it on with a wick for several consecutive days, with very considerable absorption as a result. But casual brush or spray application to wood already in place, or dip treatment of wood that is to be set in the ground, has much less value than many of the preservative advertisements would lead one to suppose.

There has been some effort to increase the durability of sapwood by giving it artificially the moisture- repellent quality of the naturally durable woods, as well as their fungitoxic quality. Some of the oil-borne preservatives supplied for treating wood that is not to be set in soil or water have waxy substances added to them which slow down the rate of subsequent water absorption. Unfortunately, most of the present attempts in this direction are in surface treatments that do not penetrate deeply enough for full effectiveness.

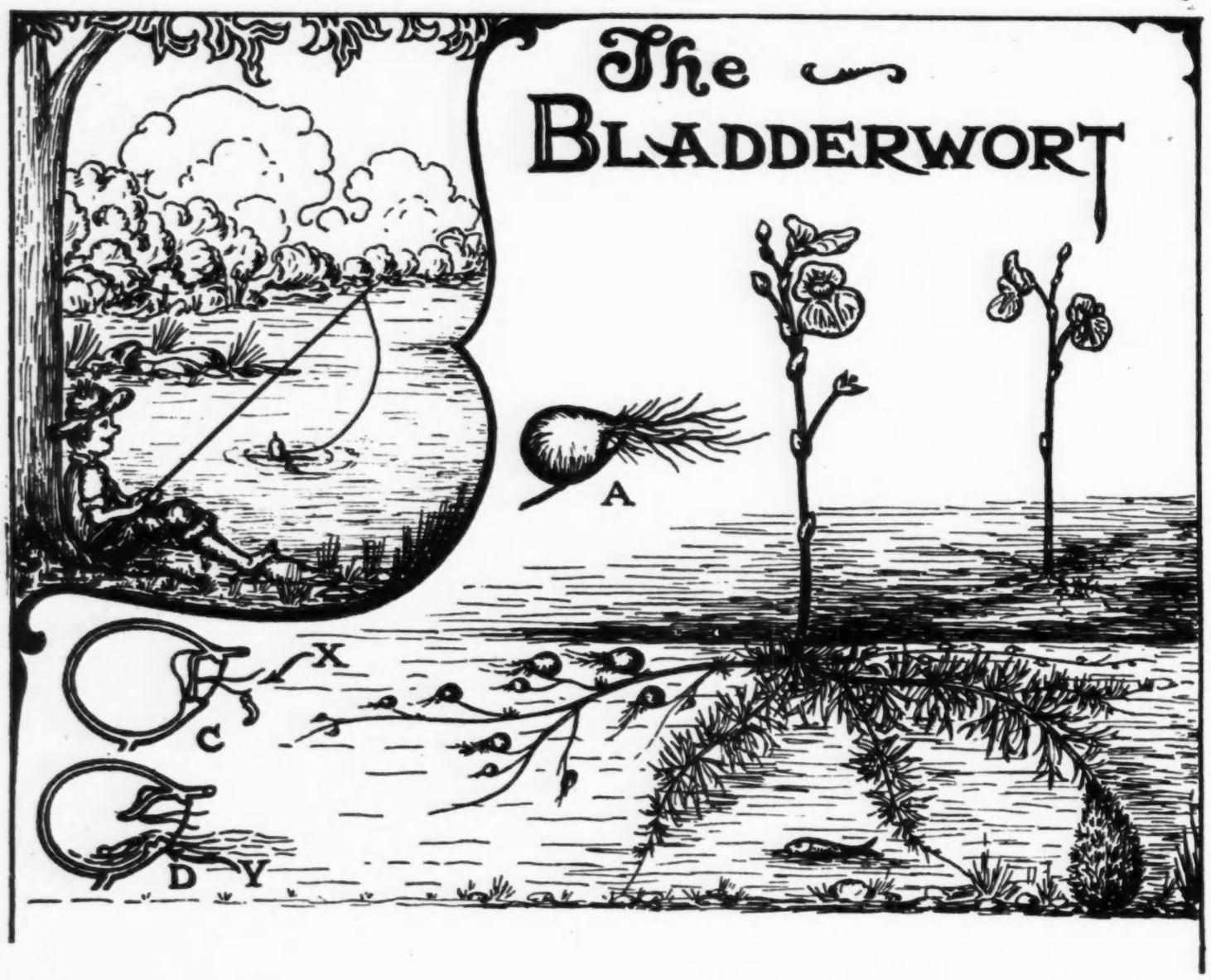
Recently, in laboratory tests, it was found that decay fungi were stopped by the ammonium salt impregnation treatments that are used for their fire-retardent effect. Reports on the use of preservatives and coatings on wood can be obtained from the Forest Products Laboratory, Madison 5, Wisconsin.

Biological Protection

Heavily stained or moldy lumber in general is to be avoided. The relatively harmless stain fungi too often mask decay infections already established. But recently announced experiments by R. M. Lindgren indicate that one of the molds can be decidedly beneficial in hindering the decay fungi in pulpwood in the South. This may mean that this mold produces an antibiotic chemical or that it acts as a parasite on the other fungi. A heavy growth of the mold is induced by spraying the freshly cut wood with a solution of a fluoride, to which this particular mold is very

(*Continued on page* 193)

PLANTICS



When a boy goes fishing, we think nothing of it. When we say a plant "goes fishing," we admit there may be cause for some skepticism.

One of the most interesting plants that "go fishing," in an ingenious way, is the bladderwort which grows in the still waters of ponds, streams and small lakes. This plant receives its name from the small sacs resembling miniature bladders which, in some species, are attached to the leaves. In other species, the plant sends out two types of stems; one bears a rather compact mass of flattened finger-like leaves, while the other has only the tiny bladders attached to it by hair-like stems.

Briefly, these miniature bladders, which are actually tiny traps, are pear-shaped, hollow bodies and usually less than one-sixteenth of an inch in diameter. The entrance to the trap is formed by the re-entering of the outside wall within itself, just as if we were to press our finger into the side of a soft toy balloon. A curtain-like door, similar to a tent flap, but open at the bottom, covers the entrance. This door is capable of pressing tightly against a doorjamb comparable to one in our own home (see diagram D-Y). In some species, tapering glandular hairs on the lower part of the door serve as a tripping mechanism. There are also a number of glandular cells that secrete a substance which lures the prey. Above the entry there are usually two elongated thread-like structures, resembling the feathery antennae of some insects; around its sides are bristle-like structures (see diagram A). These structures float into the water and serve as a weir in guiding the prey toward the tripping mechanism of the door.

Minute aquatic life, tiny tadpoles, insect larvae and very young fish are the prey of this carnivorous plant. If any one of these strays within the confines of the weir and comes into contact with the trigger hairs, the tripping mechanism goes into action (see diagram C-X). The instant this happens, the balance of forces in the trap is upset, the trap expands, the door flap swings inward and the inrushing water carries the victim into the bladder (see diagram D). The door closes quickly and the plant proceeds to digest its morsel of food.

It has been observed that within thirty minutes a bladderwort can trap a mosquito larva, reset itself and capture another prey. What an intriguing plant antic!

MAC KEEVER

American Holly

(*Continued from page* 167)

more than one-fourth inch in diameter, and in color from a bright scarlet to deep carmine, with a rare tree bearing the albino yellow form. The fruits may be colored as early as October and some as late as January.

All this means that the search for good varieties is on. It is realized that the early criterion of a good set of fruit is not sufficient. The varieties that were selected ten years or more ago are found to be deficient in one or more characters that go to make up a good plant, and they are being supplanted by newer sorts. Even the male trees, a necessary adjunct, must possess characters that will make them of some value in the landscape. Advances in our knowledge of the propagation of this plant make new plants more readily available. Formerly they were grafted but now rooting of cuttings is fairly easy. Will there ever be a "best variety"? If there were, progress would cease. We are constantly finding sorts that are better in one way or another, as to plant characters or as to adaptability to use in various situations.

And now to return to Holly Hill. This is not many miles from Sandy Hook, where is located the most northerly large stand of patriarchs of this species — nearly one hundred acres of holly forest, trees up to forty or fifty feet tall, some of which no doubt were there when Henry Hudson sailed up the river which bears his name. The holly trees at Holly Hill are probably descended from one of the trees on Sandy Hook. They must have had an outstanding ancestor, because on the property are many trees that have been transplanted from the wooded hillside, and more than half of them are good, desirable specimens. One of these, depicted on the front cover, was selected by the New Jersey Holly Research Committee and named Judge Brown in honor of the owner of the property, the instigator of research work that is contributing to our knowledge of this plant. This is his perpetual memorial.

COLOR AND DESIGN FOR EVERY GARDEN. H. Stuart Ortloff and Henry B. Raymore. 301 pages, illustrated, indexed. M. Barrows & Co., New York, 1951. $3.50.

The authors' introduction to this book is a key to its purpose — namely, to pass on the results of years of practical experience in the designing and planting of gardens to amateurs who are about to "landscape" their own home grounds.

The importance of planning before planting is stressed over and over to impress upon the reader that the setting out of plants is only a part of an effective garden. It is the design or plan that must be determined first and the book is helpful in presenting various suggestions that might work into the proportions of any given area. Many illustrative plates are worth studying to get the feel of how garden patterns are evolved for formal, asymmetrical or informal designs.

A good part of *Color and Design for Every Garden* is devoted to the selection of plants, once the garden design has been decided upon. The amateur will profit from the advice given by the authors, for many important items are discussed that a beginner might not consider. Sequence of bloom throughout the garden year, plant sizes and spacing, color schemes and special types of plantings are but a few of the general topics that are treated in detail.

Numerous planting plans are illustrated to suggest plant combinations that are professional yet simple enough for beginners to copy. Also helpful are lists of plant materials arranged according to seasons, heights and colors.

Elizabeth Anne Pullar.
Garden Consultant.

FARMING AND GARDENING IN THE BIBLE. Alastair I. MacKay. 280 pages, indexed. Rodale Press, Emmaus, Pa. 1950. $3.

The bibliography on the botany of the Bible is huge, but this is the first book to come to my attention which approaches the subject from the point of view of the farmer and gardener. Thus, the author has been able to include a wealth of material not found in any of the previous works devoted merely to Bible plants as such. Further, he has omitted the myriad references to the classic employment of each plant in Greek, Roman, Egyptian, Hindu, and other mythology found in most previous works, as well as the abstruse discussion of etymology and linguistics which make other books on the subject so unattractive to the general reader.

Commander MacKay has done a splendid job. His book is a storehouse of information presented in a very readable and interesting manner. He discusses not only the herbs, field and forest trees, fruit and nut trees, vines, flowers, vegetables, field crops, perfumes, spices, ointments, reeds, rushes, and weeds, but also has chapters on flocks and herds, draught, pack, and riding animals, poultry, pigs, and bees. Included also are chapters on the history of the Bible, the history and geography of the land, foreign influences, the farmer's year, plant pests and diseases, laws, regulations and customs regarding farming and good husbandry.

However, the book suffers from being based on a far too small bibliography. Many important works on the natural history of the Bible were apparently unknown to or ignored by the author, but the sources he did consult were good ones. His contention that the "apple" of Old Testament times was the same as ours today, that it had been introduced by Solomon and developed by him into splendid varieties similar to those we know today, only later to have reverted to its wild form due to neglect, does not conform with best modern opinion. His statement that the apple was known and cultivated in Egypt in Old Testament times is highly improbable. Similarly, his identification of the "hyssop" of the Bible with *Hyssopus* is contrary to modern botanical opinion. Fortunately, he usually avoids the pitfall of appealing to mysticism in his discussion, but his statement that there are mentioned in the Bible only "seven flowers, seven vegetables and seven weeds" and thirty-seven trees is certainly a far cry from the two hundred forty species of plants identified in the ninety-two books by botanists to date. On the other hand, his statement (on p. 83) that "In the Bible pages we find most of the flora of the Holy Land" not only is inconsistent with his previous statement, but is very untrue because Bible Lands have a flora estimated at 3,500 species.

H. N. Moldenke.

HOW TO LANDSCAPE YOUR GROUNDS. Loyal R. Johnson. 257 pages, illustrations and plans; index. De La Mare Co., Inc., New York. 2nd edition. 1950. $3.50.

There is an increasing demand for books dealing with outdoor living space on small properties, and Mr. Johnson answers specifically many practical questions. A hundred illustrations and plans, supplemented by lists of various types of shrubs and trees carefully selected by Alfred Hottes, make the book a valuable reference for amateur gardener or horticultural writer. The plans are simple and keyed to planting lists. The treatment on the whole is conservative but makes allowance for such considerations as the contemporary emphasis on horizontal line and the subtler values of foliage hue and texture at all seasons, in many different parts of the country. There are good sections on hedges, on walls, pools and pergolas, walks and drives. The chapter on lawn care includes descriptions of various types of grasses, and the one on improving your garden soil gives a table showing source and properties of fertilizer materials.

The author never claims too much, and in such challenging situations as the planting of a wild garden offers a wise warning about the "intimate knowledge of plants and fine sense of fitness" required. This is definitely a reliable and useful little book.

Marion Code, Librarian
Pennsylvania Horticultural Society

INSECTS. Herbert S. Zim & Clarence Cottam. 157 pages, illustrated by James Gordon Irving; indexed. Simon & Schuster, New York. 1951. $1.

In my opinion, the best illustrated small guide to the more familiar American insects ever published. The colored paintings show the insects in their most typical forms. The text is kept to a minimum. An excellent gift for both young and old, and certainly well worth the price.

P. P. Pirone.

THE PRIVATE JOURNAL OF HENRY WILLIAM RAVENEL. Arney Robinson Childs (editor). 428 pages, 3 illustrations, bibliography, index. University of South Carolina Press, Columbia, S. C. 1947. $6.

The author of this journal was a well educated South Carolina planter, a botanist of international distinction, and a man of rather rare religious faith and personal integrity. The journal was started October, 1859, and was continued until July 2, 1887, two weeks before Ravenel's death. It is of particular interest and value to botanists, since it gives unpublished material on the methods and working habits of one of our greatest pioneers in this field. It also tells of his voluminous correspondence and relations with other American and foreign botanists.

Ravenel was not merely a botanist, he was a keen student of public affairs, and his comments on the events leading up to the war between the states and the trying post-war period of reconstruction will be of much interest and value to historians and students of this period. This is perhaps the most important part of the journal. The most enjoyable parts are those which tell about the lives and customs of the people: their methods of travel, by

wood-burning trains and horse drawn carriages, their customs of celebrating Christmas and other holidays, of worshiping, of courtship and marriage, etc., are made vivid in these entries.

The journal reveals Ravenel as a truly noble character, kind, gentle, peaceful (except at the beginning of the war), and fair and generous in his dealings with others. For much of his life he suffered from poor health, a sort of dyspepsia he calls it. After the war, with the loss of all his property except his farm, he was reduced to selling wood to the railroad and vegetables in Aiken, to support his large family of daughters, but the journal records no complaint. He was sustained in his difficulties by his firm belief in God. Ravenel was a steadfast believer in the Southern cause and in the divine sanction of slavery (though admitting the evils of the slave trade), but when the South lost and the slaves were freed, he accepted this as Divine Providence and his Christian principles helped him to forgive and forget, and to face the great difficulties of the reconstruction period.

The frontispiece is a photograph of Ravenel at the age of seventy. There is also a nine-page biography of Ravenel by the editor, who acknowledges in this the extensive use of the late Dr. Neil Stevens' published and unpublished studies on Ravenel.

The book is less than half the total length of the original journal. The editor is to be congratulated on so judiciously selecting the material that the reader is not aware of the loss of continuity.

John N. Couch
Dept. of Botany
University of North Carolina

NATIVE ORCHIDS OF NORTH AMERICA. Donovan Stewart Correll. 399 pages, illustrations by Blanche Ames Ames and Gordon Winston Dillon. Foreword by Charles Schweinfurth. Chronica Botanica Co., Waltham, Mass.; Stechert-Hafner, Inc., New York. 1950. $7.50.

Many books, many papers have been written on orchids but this new book "brings together for the first time information concerning all of the orchids of North America, north of Mexico . . ." as the author's preface states. It is a worthy addition to botanical literature and will be appreciated by botanists and laymen who are deeply interested in these plants. The author has enjoyed the cooperation of Dr. Edgar T. Wherry and John V. Watkins in furnishing cultural notes, and excellent line drawings, both artistic and scientific, were made by Blanche Ames Ames and Gordon Winston Dillon.

BIRD GUIDE: Land Birds East of the Rockies. Chester A. Reed. 238 pages, illustrated with color plates; indexed. Doubleday & Co., Garden City, N. Y. 1951. $1.50 (cloth), $1.95 (Fabrikoid binding).

This excellent means of bird identification has been highly regarded ever since the first edition appeared in 1906. It has been completely revised and printed from new color plates, and its compact form will fit conveniently into pocket or pocketbook, as *Bird Guide* accompanies bird enthusiasts into woods and fields.

RECENT ACQUISITIONS

TO THE LIBRARY

Methods of Vitamin Assay, prepared and edited by the Association of Vitamin Chemists, Inc., 2d ed., rev. and supplemented. N. Y., Interscience Publishers, 1951. $5.50.

Two Little Gardeners by Margaret W. Brown and Edith T. Hurd. N. Y., Simon and Schuster, 1951. $.25.

Textbook of Intermediate Plant Science by George B. Cummins and others. Minneapolis, Burgess Pub. Co., 1950. $3.25.

An Introduction to Plant Physiology by O. F. Curtis and D. G. Clark. N. Y., McGraw-Hill Book Co., 1950. $6.50.

Mendelism and Evolution; 5th ed.; by E. B. Ford. N. Y., John Wiley and Sons, 1949. $1.75.

Labelled Atoms by Raymond Glascock. N. Y., Interscience Publishers, 1951. $1.25.

Practical Herb Growing by D. G. Hewer. London, G. Bell and Sons, 1948. $1.50. (reissue)

Lichens of the State of Washington by Grace E. Howard. Seattle, Univ. of Wash. Press, 1950. $3.00.

A Day at the Beach by Kathryn and Byron Jackson. N. Y., Simon and Schuster, 1951. $.25.

The Chemistry and Technology of Food and Food Products; 2d rev. ed.; by Morris B. Jacobs. vol. 1-2. N. Y., Interscience Publishers, 1951. vol. 1, $12.00; vol. 2, $15.00.

A Manual of the Flowering Plants of California by Willis L. Jepson. Berkeley, Univ. of Cal. Press, 1951. $5.00. (reissue)

Mycotrophy in Plants; Lectures on the Biology of Mycorrhizae and Related Structures by Arthur P. Kelley. Waltham, Mass., Chronica Botanica, 1950. $5.00.

An Illustrated Manual of California Shrubs by Howard E. McMinn. Berkeley, Univ. of Cal. Press, 1951. $6.50. (reissue)

The Measurement of Linkage in Heredity; 2d ed., rev.; by K. Mather. N. Y., John Wiley and Co., 1951. $1.75.

General Botany Laboratory Book; 2d ed.; by E. M. Palmquist and L. C. Petry. Phil., W. B. Saunders Co., 1951. $2.25.

Wild Flowers by W. R. Philipson. (Black's Young Naturalist's series) London, A. and C. Black, 1950. $1.25.

Algae of the Western Great Lakes Area by G. W. Prescott. Bloomfield Hills, Mich., Cranbrook Instit. of Science, 1951. $10.50.

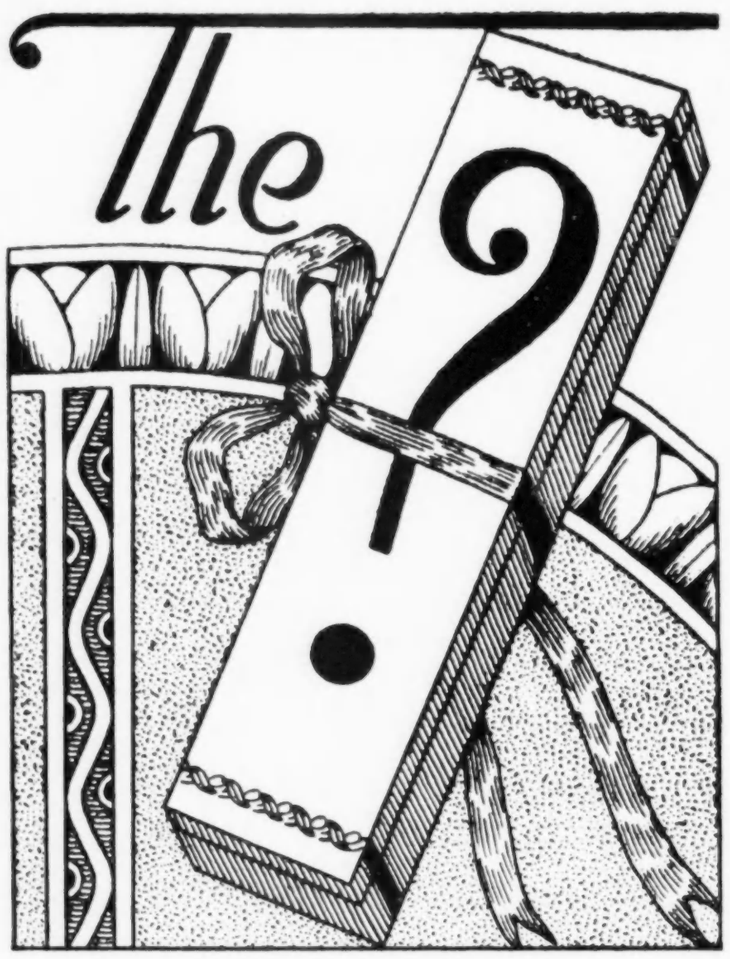
A Guide to the Spring Flowers of Minnesota; 8th rev. ed.; by C. O. Rosendahl and F. C. Butters. Minneapolis, Burgess Pub. Co., 1951. $2.25.

A Day at the Playground by Miriam Schlein. N. Y., Simon and Schuster, 1951. $.25.

Camellias Illustrated; rev. ed.; by M. L. Sharp. Portland, Oregon. Western Trail Publishers, 1949. $5.00.

Manometric Techniques and Tissue Metabolism; 2d ed.; by W. W. Umbreit and others. Minneapolis, Burgess Pub. Co., 1949. $4.00.

The Chromosomes; 4th ed.; by M. J. D. White. N. Y., John Wiley and Sons, 1950. $1.75.



Address your questions to *The Question Box, The Garden Journal of The New York Botanical Garden*, Bronx Park, New York 58, N. Y.

Q. I would like some information about my white night-blooming cereus, about fifteen years old. It's planted in a very large earthen jar and does not have a trellis to climb. I have no space to plant it in the ground. This year it had thirteen blossoms but only five came to full bloom. Now it is turning soft and brown and appears to be dying.

Is there any plant food I should give it? Should I transplant it? If so, how should I divide the plant? How often should I water it? I have been watering it about twice a week. Should it be cut back and if so how far?

A. Without seeing your night-blooming cereus, it is difficult to say with certainty why its stems are turning soft and brown. The most probable causes are that either it is infected with a fungus disease or that its roots are in poor condition, due, perhaps, to overwatering or to some other unfavorable soil condition. I am inclined to suspect overwatering, because once a week seems rather often to water a cereus that is in a "very large" container.

It is not advisable to give plant food to a cactus that is in a sickly condition. Under the circumstances, I suggest the following procedure:-

Cut away all dead stems and those that are brown and soft. Dust the cut surfaces with sulphur. Remove the plant from its present container, pick away any rotted roots and soil that does not contain roots and repot the plant into a new container that is just large enough to accommodate comfortably the root mass.

Be sure that the new container has one or more holes in its bottom and over these place two or three inches of broken crocks, broken bricks or coarse cinders to assure drainage. Cover the drainage material with coarse leaves or moss to prevent the soil from washing through and clogging it.

(*Continued on page* 191)

News, Notes and Comments

State Flowers Exhibited by The New York Botanical Garden. A complete collection of the official flowers of the forty-eight states, Alaska and Hawaii, were displayed by The New York Botanical Garden in its exhibit at the National Home Furnishings Show. Grand Central Palace, New York City, September 20 - 30. The flowers were pressed, mounted and attractively framed and each one was linked to the particular state from which it comes, on the large maps of the United States, Alaska and Hawaii, which formed the background of the exhibit. Fresh flowers were flown in during the show from Hawaii through the courtesy of T.W.A. and the Philippine Airlines.

Plant Expedition to Guayana Highlands. Dr. Bassett Maguire, Curator at The New York Botanical Garden, left New York in October on the Sinclair Oil Company tanker, Phoenix, to lead another plant collecting expedition in the Guayana Highlands of northeastern South America.

This crucial area has been the subject of a long-term program of plant exploration conceived by The New York Botanical Garden, which sent its first expedition there in 1925. The territory is one of the most sparsely inhabited and oldest regions in South America. Its scientifically rich flora should add immensely to our knowledge of the problems of plant distribution, dispersal, and evolution. It may also yield interesting, hitherto undiscovered economic, medicinal, or decorative plants.

The continuation of these expeditions has been made possible through the generosity and interest of R. H. Kunhardt, retired president of the Venezuelan Petroleum Company, and chairman of the Garden's Exploration Committee. He supervised and planned the present six-months' trip with Dr. Maguire.

Trade goods for the Indians are ready to be packed; included are shirts, trousers, hats and belts to supply twenty-four men and enough yard goods to make forty dresses.

For six or eight weeks Dr. Maguire will work in cooperation with D. B. Fanshawe, Conservator of Forests of British Guiana. They will study the woods of the northeastern Pacaraima Mountains which are on the eastern periphery of the Guayana Highlands.

From there Dr. Maguire will travel to Ciudad Bolivar, Venezuela, to conduct studies for the Orinoco Mining Company involving the relationship between the plant cover of an area and the possibility of iron ore deposits.

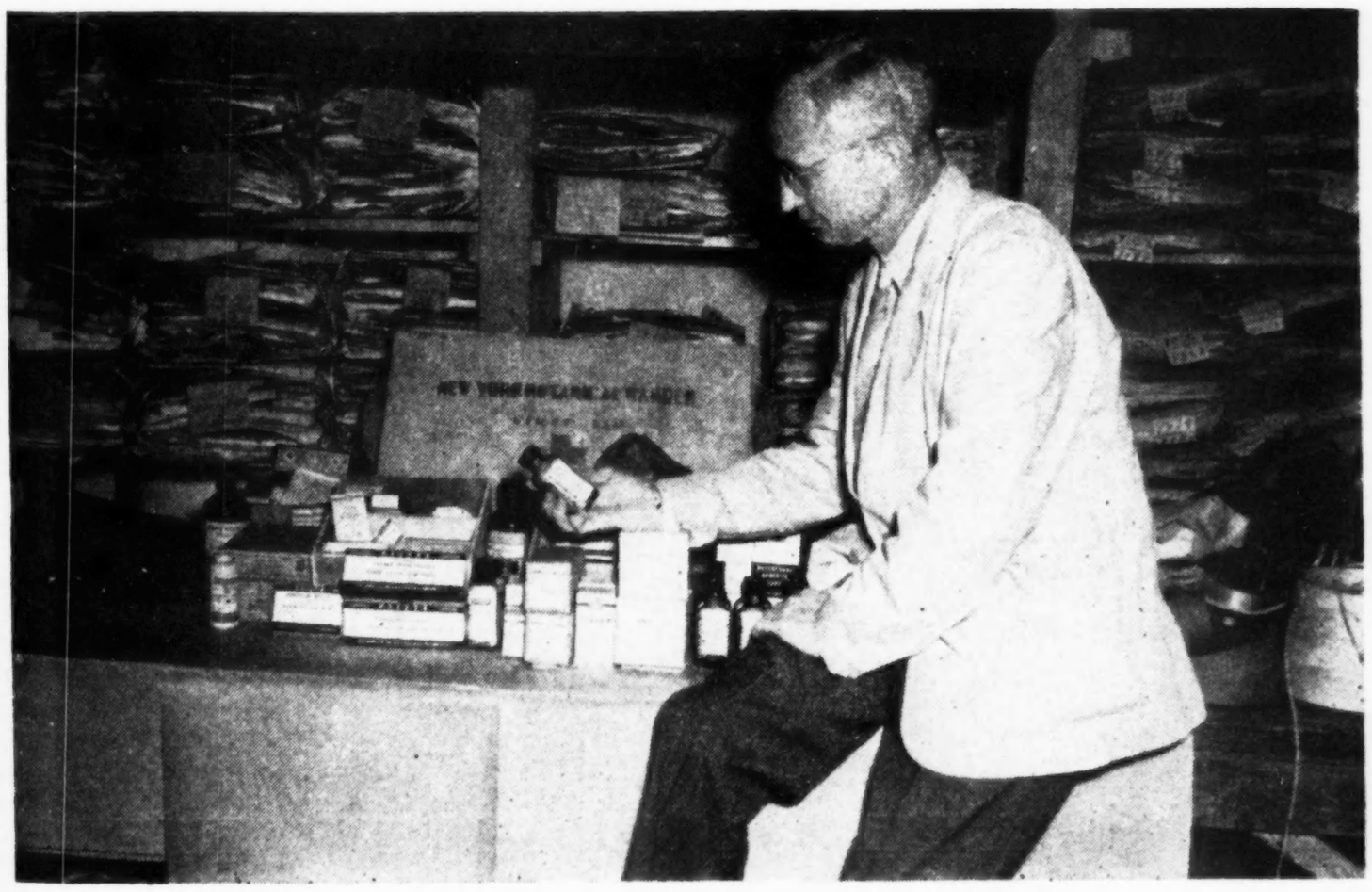
After this survey, the expedition will set out for Cerro Guaiquinima on the Rio Paraqua. This mountain is situated between the regions of the Amazons and the Gran Sabana and it is expected that its flora will reveal the transitional aspects between the two regions.

Dr. Maguire will also join the William H. Phelps, Jr. ornithological expedition to the Gran Sabana, where he will continue his collections of the flora.

An expedition such as this requires an enormous amount of equipment. Dr. Maguire estimates that the party will have about three tons of gear when it starts from the Orinoco River. The collecting and pressing material for plant specimens alone includes 20,000 sheets of newspaper, a series of presses and stoves for drying material, and canvas bags to serve as protection.

Medical supplies have been generously donated from various drug concerns. Parke, Davis and Company has contributed the remarkable anti-malarial camoquin, and the new antibiotic, chloromycetin. Squibb & Sons have donated penicillin and sulfadiazine. Chas. Pfizer & Co., Inc., has contributed penicillin and terramycin. Sears, Roebuck & Co., has donated many items suitable for distribution among the natives. These include dress goods, needles, shirts, trousers, knives, blankets, beads and other ornaments. A twenty-five horsepower motor, donated by the Johnson Motor Company, is another welcome gift, since rivers are the main highways in this section of South America.

Federated Garden Clubs of New York State, Inc. The first two-day Fall Conference was held at Lake Minnewaska, N. Y. on October 15 and 16. The program included board of directors' meeting, garden club presidents' breakfast, state committee forums on conservation and roadside beautification, horticulture, junior gardeners, etc., tour of Minnewaska nature trails, and lecture by John C. Wister. Mr. Wister's subject was "Plant Explorers and Plant Breeders and What They Have Done For Our American Gardens."



Dr. Bassett Maguire is examining the first aid and medical kits for his Venezuelan expedition. Tincture of merthiolate has been found the most popular antiseptic with the Indians—they like the color and the sting.

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Our descriptive catalogue, sent upon request, lists seeds of the less usual species, alpines, bulbs, shrubs, conservatory exotics and the like.

Royal-Liverpool Flower Show. There were more than five hundred entries at the eighth annual garden show of the Royal-Liverpool Insurance Group, held in the company's building, 150 William Street, New York City, on September 10. The judges, John W. Johnston, Garden Editor of The New York Herald Tribune, Richard B. Farnum, Executive Secretary of the Horticultural Society of New York, Alys Sutcliffe of the Brooklyn Botanic Garden, and Dorothy E. Hansell, editor of The Garden Journal of The New York Botanical Garden, were impressed with the superior quality of the exhibits. Credit for the excellent display of flowers, fruits, vegetables and flower arrangements is due A. C. Hoffman, show chairman and his able committee of twenty, and to the company's officials in sponsoring such a commendable undertaking. Major C. R. Redgrave stated that the home office in England holds two shows each year—in spring and in fall. These shows were begun before the war, suspended during the war and resumed two years ago. At the show in Liverpool on July 18, "the green-fingered colleagues produced a record number of splendid exhibits." These included fine roses, carnations, delphiniums, and sweet peas for which cups were awarded.

"By a Japanese Waterfall." A dramatic feature of the indoor Chrysanthemum Show at The New York Botanical Garden Nov. 2 - 18, is the waterfall (*sayu-ochi* type.). From a massive rocky cliff the water drops sheerly into a turbulent rocky pool from which it emerges into a quieter foreground pool. Chrysanthemums decorate the cliff while above it the foliage of semi-tropical trees reaches to the dome of the conservatory. The floral display consists of over eight hundred chrysanthemum plants in a great variety of color and form—standards, cascades, baskets etc. A Japanese tea house, bridge and gateway lend atmosphere to the colorful scene.

Pansie Collection of Kodachromes. A collection of 4,516 35 mm. kodachrome slides, taken by the late Russell Tinling Pansie, are now on deposit at The New York Botanical Garden. About two-thirds of the slides represent native plants within a hundred mile range of this vicinity, and the balance are cultivated plants. These slides have been made available to The New York Botanical Garden by the Estate of Russell Tinling Pansie as a memorial to him, and in appreciation of the cooperation he enjoyed from E. J. Alexander, Associate Curator.

Award to Mrs. Thacher. The Garden Club of America achievement medal was awarded to Mrs. Alfred B. Thacher in recognition of the inestimable value to horticulture of her practical and creative research in behalf of the genus *Ilex*. Mrs. Thacher contributed an article on her work with holly to the December 1950 issue of the Journal of The New York Botanical Garden.

Scholarship in Landscape Architecture at Harvard. The Department of Landscape Architecture, Graduate School of Design, Harvard University, offers a $600 scholarship for the next academic year. Candidates must have received their Bachelor's degree, or equivalent, within the past four years, or be eligible for this degree in June 1952.

The curriculum embraces broad-scale physical planning, civic design, housing, parks and parkways, and there is active collaboration with architects and with city and regional planners. Inquiry should be directed, before December 1, 1951, to the Chairman, Department of Landscape Architecture, Robinson Hall, Harvard University.

Gifts to the Library. Recent donations to the library of The New York Botanical Garden are a collection of files of fourteen gardening periodicals and six books from Mrs. Malcolm MacKay and sixty-seven volumes from Mrs. Addison S. Pratt. Mrs. Pratt's gift includes *The Gardens of Rome* by Gabriel Faure, *Garden Ornament* by Gertrude Jekyll and Christopher Hussey, and *Les Beaux Jardins de France* by Hector Saint-Sauveur.

Founders' Day. Founders' Day was held at The New York Botanical Garden on October 10. Dr. William J. Robbins, Director, spoke of the founding and early history of the Garden; Charles B. Harding, President of The New York Botanical Garden, and Benson B. Sloan, grandson of Samuel Sloan, one of the founders, briefly addressed the gathering. Tea was served in the Members' Room.

Staff Members Leave. Dr. Harold N. Moldenke, Curator and Administrator of Herbarium, will leave The New York Botanical Garden the end of the year to assume the position of Superintendent of Nature Activities for the Union City, New Jersey, Park Commission, and Director of the Trailside Museum in the Watchung Reservation in April, 1952. His appointment was effective October 1. Dr. F. W. Kavanagh, Associate Curator of Laboratories, recently left the Garden to join the staff of the Commercial Solvents Corporation in Terra Haute, Indiana.

The Question Box

(*Continued from page* 189)

Use a porous soil (a mixture consisting of one part good top soil, one part humus or leafmold, one part coarse sand and one part finely chopped brick is good). To each bushel of this add a pint of bonemeal and a pint of lime. Mix thoroughly. Pack the potting soil quite firmly between and around the roots. Finish with the surface level and sufficiently below the rim of the pot to allow for watering.

Repot when the new soil is moist but not wet. Do not water for several days afterwards but keep the stems sprayed daily with clear water. When the soil becomes dry soak it thoroughly, then let it become nearly dry again before you soak it again. The periods between waterings will vary according to weather and other variable circumstances but always let the soil get nearly dry, then water. And when you do water be sure that you soak the whole body of soil thoroughly.

Provide a trellis or other suitable support and tie the stems to this.

T. H. Everett, Horticulturist

Q. What is the scientific name for the "sacking tree" of India and what are its uses?

A. In *A Dictionary of Economic Products of India* by George Watt, Volume 1, page 267, we find that *Antiaris toxicaria* (the Upas Tree) is "in Western India well known as the sacking tree, on account of the tough, inner, fibrous, felted bark, being removed entire, thus forming natural sacks. Small branches are made into legs of trousers and arms of coats, the larger ones forming the bodies of the garments. In this way felt costumes are made which require no more sewing than is necessary to connect the part together. . . . In making sacks sometimes a disk of the wood is left attached to the fibre so as to form the bottom of the sack. At other times a vertical incision is made on the tree and a transverse cut around the stem at the top and bottom of this vertical one. The bark is then peeled off, and after being beaten in water and dried, the top and bottom are sewed up (forming the sides of the sack). These sacks are extensively used for storing rice. In Ceylon ropes are made of the bark . . . The seeds are used as a febrifuge and in dysentery: dose ⅓ to ½ seed three times a day. (Surgeon-Major W. Dymock, Bombay.)"

Elizabeth C. Hall, Librarian

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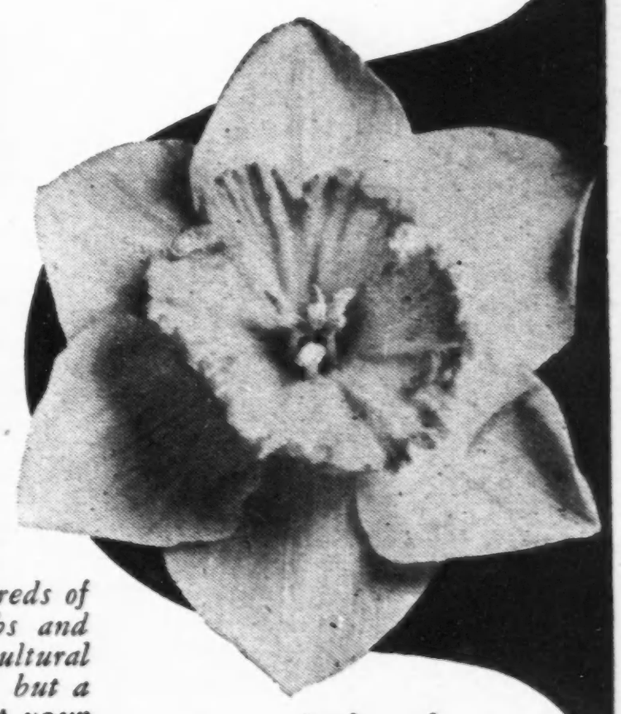

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Wayside Gardens

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The New York Botanical Garden was incorporated by a special act of the Legislature of the State of New York in 1891. The Act of Incorporation provides, among other things, for a self-perpetuating body of incorporators, who meet annually to elect members of the Board of Managers. They also elect new members of their own body, the present roster of which is given below.

The Advisory Council consists of 12 or more women who are elected by the Board. By custom, they are also elected to the Corporation. Officers are: Mrs. Hermann G. Place, Chairman; Mrs. James C. MacKenzie, First Vice-Chairman; Mrs. Guthrie Shaw, Second Vice-Chairman; Mrs. Barent Lefferts, Recording Secretary; Mrs. Hugh Peters, Corresponding Secretary; and Mrs. John E. Parsons, Treasurer.

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FROM THE HERB SHELF

THE VERSATILE DILL

Dill is apt to be associated with pickles, of the large, solid variety; but it has many other uses. The foliage, finely cut with scissors, goes into French dressing over sliced cucumbers. It is also excellent added to the gravy in a lamb stew. The seeds add a new flavor, used sparingly, to sandwich pastes. But I especially recommend dill with string beans, as follows:

Cut fresh string beans into one-inch lengths and cook until tender. You may use the little young beans cut lengthwise, if you have them. Drain and return to saucepan with a lump of butter and a tablespoonful of finely cut dill. Cover for a few moments to reheat and allow seasonings to blend, adding salt and fresh-ground pepper. At the last moment, stir in rapidly one unbeaten egg. Martha Genung Stearns

Dill, *Anethum graveolens*, is usually grown from seed as an annual. Seed may be sown as soon as all danger of frost is gone. A rather sheltered spot should be selected where the plants will receive good sun. They thrive best in a sandy, well-drained, moderately rich soil. Because the roots of these plants form a network of fine threads, they are not easily transplanted. The plants reach a height of thirty or more inches, and unless they are grown in a very sheltered position, they may require staking when they are about eighteen inches tall.

Native to the East and the Mediterranean regions, dill has a long history. It was considered so important in Biblical times. it was included in the payment of tithes. Pliny, in his *Natural History*, listed dill as the chief ingredient of nine medicinal remedies. And the term "dill" is derived from an old English verb "dilla" meaning to lull, because of its soothing effect on babies.

Another name for dill is "meetin' seeds." This arose from the custom of carrying the seed heads to church in order to nibble on them during the long services. In this way the adult churchgoers stayed awake and the children stopped fidgeting!

Long Life for Wood

(*Continued from page* 186)

tolerant. Wood so treated has remained practically free from decay for a year, in a Gulf Coast locality where wood without this mold loses as much as twenty per cent of its weight by decay.

CONCLUSION

Much of the wood now available contains a large percentage of sapwood. Sapwood absorbs moisture more readily and is less decay-resistant than heartwood. But in most uses above ground ordinary good construction and maintenance keep wood too dry for decay. In situations where excessive moisture can not be avoided, the naturally durable woods or wood impregnated with a good chemical preservative will give long service to the user. Wood preservatives also have a distinguished record in decreasing the drain on the national timber resource.

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